Annex 1

Expert Report of Sabrina T. Howell

IN THE UNITED STATES BANKRUPTCY COURT
FOR THE DISTRICT OF DELAWARE

In re: FTX TRADING LTD., *et al.*,[1] Debtors.	Chapter 11 Case No. 22-11068 (JTD) (Jointly Administered)

EXPERT REPORT OF SABRINA T. HOWELL

DECEMBER 27, 2023

[1] The last four digits of FTX Trading Ltd.'s and Alameda Research LLC's tax identification number are 3288 and 4063 respectively. Due to the large number of debtor entities in these Chapter 11 Cases, a complete list of the Debtors and the last four digits of their federal tax identification numbers is not provided herein. A complete list of such information may be obtained on the website of the Debtors' claims and noticing agent at https://cases ra.kroll.com/FTX. The principal place of business of Debtor Emergent Fidelity Technologies Ltd is Unit 3B, Bryson's Commercial Complex, Friars Hill Road, St. John's, Antigua and Barbuda.

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I. INTRODUCTION

A. Background and Assignment

1. Prior to November 11, 2022 (the "Petition Date"), the FTX group operated exchanges for trading digital assets primarily through FTX.com and FTX.US, along with, as relevant for this report, FTX EU and Liquid Global (collectively, the "Exchanges").[2] On the Petition Date, the entities owning and operating the Exchanges and certain of their affiliated debtors and debtors-in-possession (collectively, "FTX" or "the Debtors") filed for Chapter 11 bankruptcy with the United States Bankruptcy Court for the District of Delaware (the "Chapter 11 Cases") while facing a "severe liquidity crisis."[3]

2. FTX customers had claims based on digital and conventional assets, categorized as: (i) fiat currency, (ii) stablecoins, (iii) futures, (iv) leveraged tokens, (v) tokenized stocks, (vi) "Spot+" derivatives,[4] (vii) non-fungible tokens ("NFTs"), (viii) equity and equity-like claims in FTX including FTT tokens, (ix) remaining cryptocurrencies and tokens, and (x) non-marketable digital assets. In the remainder of this report, I refer to digital assets using the terms "coin" and "token." A "coin" is the native token of a blockchain (such as BTC on the Bitcoin blockchain or ETH on the Ethereum blockchain). A "token" is a digital asset that is created and exchanged on

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2 "About FTX Token," *CoinMarketCap*, available at https://coinmarketcap.com/currencies/ftx-token. FTX.US was not a derivatives exchange. *Commodity Futures Trading Commission v. Samuel Bankman-Fried et al.*, Amended Complaint, Case No. 1:22-cv-10503-PKC, December 21, 2022, pp. 1, 10-11.

3 *FTX Trading Ltd., et al., Debtors.*, Official Form 201 Voluntary Petition for Non-Individuals Filing for Bankruptcy, Case No. 22-11068-JTD, November 11, 2022; *FTX Trading Ltd., et al., Debtors.*, Motion for Joint Administration Filed by FTX Trading Ltd., Case No. 22-11068-JTD, November 14, 2022. *See also* Declaration of John J. Ray III In Support of Chapter 11 Petitions and First Day Pleadings, November 17, 2022, p. 14. West Realm Shires Inc. filed for Chapter 11 bankruptcy on November 14, 2022.

4 I understand that Spot+ derivatives were derivatives offered by FTX EU Ltd. ("FTX EU") that aimed to mimic the price movements of digital assets such as coins and tokens.

another blockchain (nearly all initial coin offering ("ICO") tokens, including FTT, are smart contracts within the Ethereum blockchain). I also use the term "digital assets" to generically refer to coins, tokens, and their derivatives.

3. In the regular course of business, brokerages hold customer assets one-to-one.[5] As has been established in these Chapter 11 Cases, and consistent with my review of the data, this was not the case for the Debtors.[6] The imbalance between the composition in customer claims based on fiat and digital asset holdings and that reflected on the balance sheets of the Debtors means that the Debtors are unable to return all fiat and digital assets to their customers in kind. Moreover, I understand the fiat and digital assets were not segregated in customer accounts and were commingled. Therefore, I understand that as part of the bankruptcy process it will be necessary to provide a value in U.S. dollars ("USD") as of the petition time of 10:00 a.m. ET on the Petition Date (the "Petition Time") for claims based on digital assets, and for the Debtors to liquidate their balance sheets in order to provide distributions in USD under any confirmed plan of reorganization.

4. I was asked by Sullivan & Cromwell LLP ("Counsel")[7] to assist with determining the value of creditor claims associated with digital assets by evaluating the likely effect of

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5 "If a Brokerage Firm Closes Its Doors," *Financial Industry Regulatory Authority,* available at https://www.finra.org/investors/insights/if-brokerage-firm-closes-its-doors ("Brokerage firms are required to follow certain rules that are designed to … protect customer assets … SEC Rule 15c3-3 – the 'Customer Protection Rule' – requires brokerage firms that have custody of customer assets to keep those assets separate from their own accounts. Customers' cash must be placed in a special, separate 'reserve' account, and fully paid customer securities must be kept separate from firm and customer margin securities.").

6 Osipovich, Alexander, Caitlin Ostroff, Patricia Kowsmann, Angel Au-Yeung, and Matt Grossman, "They Lived Together, Worked Together and Lost Billions Together: Inside Sam Bankman-Fried's Doomed FTX Empire," *The Wall Street Journal*, November 19, 2022, available at https://www.wsj.com/amp/articles/sam-bankman-fried-ftx-alameda-bankruptcy-collapse-11668824201 ("[FTX] was an unruly agglomeration of corporate entities, customer assets and Mr. Bankman-Fried himself […]. No one could say exactly what belonged to whom.").

7 I understand that Counsel is retained on behalf of FTX. To the extent I received instructions or understanding from Counsel on certain matters for the purpose of this report, I therefore reference these instructions or understandings as originating from FTX.

liquidating the Debtors' holdings of each digital asset claimed by creditors (in USD equivalent) as of the Petition Time. This includes determining the discount at which the Debtors would have been able to sell their holdings, including derivative contracts created by FTX but excluding NFTs, in an orderly liquidation commencing at the Petition Time. I refer to these discounts as "asset liquidation discounts."[8] I have also been asked to calculate the discount that would have applied to cryptocurrencies claimed by the Debtors' customers that were not marketable (*e.g.*, "locked digital assets") as of the Petition Time. Last, I was asked to opine on the fundamental value of FTT and equity claims in FTX as of the Petition Date, under the assumption that FTT would play no role in any exchange following the effective date of a confirmed plan of reorganization. Finally, I was asked to apply any discounts that may result from the above steps to the complete list of digital assets on which creditor claims are based.

B. Qualifications

5. I am an Associate Professor of Finance at the New York University Stern School of Business ("NYU Stern"). I currently serve as a Research Associate at the National Bureau of Economic Research and a Research Fellow at the Institute for Private Capital. My research and teaching focus on entrepreneurial finance, fintech, private equity, innovation, and China. My research has been published in *The Journal of Finance*, *The Quarterly Journal of Economics, The Review of Financial Studies, The Journal of Financial Economics, Management Science*, the *American Economic Review*, and the *Review of Finance*. My paper entitled "Initial coin offerings: Financing growth with cryptocurrency token sales," published in 2020 in *The Review of Financial*

[8] For parsimony, I was instructed by FTX to only apply an asset liquidation discount to a digital asset's price if the calculated discount exceeds 10 percent.

Studies, has been cited 668 times as of this writing, making it to my knowledge the most highly cited article in financial economics about ICOs.

6. At NYU Stern, I created and teach a course titled "Applications in Entrepreneurial Finance: Fintech" for graduate and undergraduate students. A substantial portion of this course is devoted to cryptocurrency markets, including sessions on applications of blockchain to financial markets, ICOs and NFTs.

7. I have received awards for my teaching and research, including being named a Poets & Quants Best 40-Under-40 MBA Professor in 2023 and winning the AQR Asset Management Institute Young Researcher Award in 2021 as well as the Kauffman Foundation Junior Faculty Research Fellowship in 2017 (which goes to the top researcher in entrepreneurship). I have also raised nearly $500,000 in grants to support my research from institutions including the Alfred P. Sloan Foundation, the Omidyar Network, and the Kauffman Foundation.

8. I received my B.A. in Economics and East Asian Studies from Yale University in 2008, my M.A. in Economics from Harvard University in 2012, and my Ph.D. in Political Economy and Government, Economics Track from Harvard University in 2015. From 2008 to 2009, I was a consultant at Charles River Associates, an international economic consulting firm. Before pursuing my doctoral studies, I worked at Securing America's Future Energy, with a focus on energy security policy.

9. I joined the faculty of NYU Stern in 2015 as an Assistant Professor and was promoted to Associate Professor with tenure in 2022. I have served as an Associate Editor for *Management Science* (2020-2022), *The Review of Financial Studies* (2022-present), and *The Review of Corporate Finance Studies* (2022-present).

10. My curriculum vitae is attached to this report as Appendix A.

C. Compensation

11. I am being compensated for my time spent working on this matter, including any testimony, at my standard billing rate of $950 per hour. Some of the research and analysis for this report was performed by Analysis Group personnel under my direction and guidance, and I receive additional compensation based on their fees. Neither my compensation nor that of Analysis Group is contingent upon my findings, the testimony I may give, or the outcome of this matter.

D. Materials Considered

12. In preparing this report, I, along with Analysis Group staff working under my direction, reviewed various documents and data sources. Appendix B to this report lists documents and data sources that I considered in preparing this report. My work in this matter is ongoing, and I may supplement this report if information that alters any of my opinions comes to my attention after this report is submitted.

II. SUMMARY OF CONCLUSIONS

13. In an orderly liquidation commencing at the Petition Time, certain digital assets would likely have been sold at average prices below the market prices prevailing as of the Petition Time. This "asset liquidation discount" reflects that in certain illiquid digital asset markets, the sale of the Debtors' holdings would have likely impacted the market price. As of the Petition Time, the Debtors held 577 out of 1,321 unique digital assets that I understand have potential customer claims associated with them, excluding NFTs. Based on my application of a well-founded model of price impact and transaction cost, I estimate that an asset liquidation discount exceeding 10

percent of the Petition Time market price would affect 71 of the digital assets that are both claimed by customers and held by Debtors. I do not apply an asset liquidation discount to fiat currency positions, stablecoins, tokenized stock, or futures. For remaining digital assets that are wrapped, staked, or locked, I calculate the asset liquidation discounts based on the underlying coins or tokens.

14. I further understand that a subset of customer claims involves "locked" digital assets that customers would not have been able to sell in the open market as of the Petition Time. All else equal, assets that are not marketable are less valuable than marketable assets. Therefore, for locked digital assets, I estimate additional discounts for lack of marketability ("DLOM").

15. Lastly, I understand that certain customer claims involve tokens that represent common shares in FTX, or claims tied to FTX's future activity, such as the FTX token FTT. Equity claims are at the bottom of the hierarchy for repayment in bankruptcy proceedings. I understand from Counsel that equity holders are not expected to be compensated pursuant to the plan of reorganization in these Chapter 11 Cases, as of this writing. Furthermore, I understand from Counsel that any sale of the Exchanges' assets would not involve a role for FTT following the effective date of a confirmed plan of reorganization. Under those assumptions, it is my opinion that FTT and FTX equity claims have zero fundamental value.

16. The remainder of my report is organized as follows. In Section III, I discuss classes of assets subject to customer claims and whether each class would be subject to valuation adjustments in the context of my assignment. In Section IV, I describe my methodology for estimating asset liquidation discounts and DLOM for the relevant subsets of digital assets, as well as my reasoning for my opinion that the fundamental value of FTT and FTX equity claims is zero

in the context of these Chapter 11 Cases. Appendix C provides further detail on the technical aspects of my methodology for estimating asset liquidation discounts and DLOM.

III. OVERVIEW OF ASSET VALUATION

17. In this section, I provide a high-level overview of the different asset classes under which customer claims fall and summarize my approach to valuing the assets in each class.

18. I outline my approach to valuing the assets held by the Debtors that are also the subject of customer claims in Exhibit 1. I categorize assets subject to customer claims into the following: (i) fiat currency, (ii) stablecoins, (iii) futures, (iv) leveraged tokens, (v) tokenized stocks, (vi) Spot+ derivatives, (viii) NFTs (which I have not been asked to consider), (viii) equity and equity-like claims in FTX and FTT tokens, (ix) remaining digital assets, including cryptocurrencies and digital tokens, and (x) non-marketable digital assets.

19. I received Petition Time prices from Alvarez & Marsal ("A&M") for each of the digital assets.[9] I do not apply an asset liquidation discount or DLOM to the Petition Time prices of fiat currency, stablecoins, futures, leveraged tokens, tokenized stocks, Spot+ derivatives, and most remaining coins and tokens. In total, I calculate a discount (either an asset liquidation discount, DLOM, or adjustment arising from these Chapter 11 Cases) for 107 out of 1,321 total unique assets[10] that are the basis of potential customer claims.[11] I implement three adjustments: (i)

[9] For further details, *see* Appendix C. A&M is a consulting firm that works as a financial advisor for Debtors in these Chapter 11 Cases. Among other things, A&M has been assisting Debtors with identifying and verifying assets of the Debtors. *See* Supplemental Declaration of Edgar W. Mosley II in Support of First Day Pleadings, November 21, 2022.

[10] In addition to these discounts, I set the Petition Time price of 84 digital assets to zero as the price of these assets in the dataset available to me was over a month stale. *See* Section IV for additional detail on stale prices.

[11] I understand from FTX that of these 1,321 unique assets included in Exhibit 6, 15 are not the basis for any customer claims as of the time of writing but may potentially become the basis for customer claims in the future.

an asset liquidation discount reflecting the expected transaction costs and price impact of selling the Debtors' holdings in an orderly liquidation commencing as of the Petition Time in an imperfectly liquid market; (ii) a DLOM to certain non-marketable digital assets; and (iii) I set the value of FTT and FTX equity to zero.

20. Figure 1 summarizes the aggregate face value of customer claims and the corresponding face value of the Debtors' holdings as of the Petition Time.[12] Assets for which I do not estimate positive discounts comprise $10.5 billion in customer claims, or 83.9 percent of the total $12.5 billion in customer claims.

Figure 1
Summary of Customer Claims

	Count of Unique Assets	Face Value of Customer Claims ($MM)	Face Value of Debtors' Holdings ($MM)
Fiat Currency	21	$5,423	$727
Stablecoins	29	$926	$232
Futures	295	$424	$0
Leveraged Tokens	248	$8	$86
Tokenized Stocks	57	$55	$0
Spot+ Derivatives	200	$25	$0
FTX Equity Claims and FTT	13	$727	$722
Remaining Digital Assets			
Wrapped Tokens	7	$35	$28
Staked Tokens	4	$47	$20
Other Digital Assets	421	$3,777	$7,694
Non-Marketable Assets	26	$1,015	$0
Grand Total	1,321	$12,462	$9,509

Notes and Sources:
[1] See Appendix C – Section C-I.B-C.

For parsimony, in this report I refer to the set of 1,321 unique assets included in Exhibit 6 as assets that are the basis for customer claims.

[12] I use the term "face value" of a particular quantity of an asset to refer to the multiplication of that quantity with the unadjusted Petition Time price of the asset.

21. In the following, I discuss each asset class under which customer claims fall and my reasoning for whether to apply an adjustment to the Petition Time prices.

A. Fiat Currency

22. Fiat currency claims represent claims that are based on legal tender in each fiat currency's respective issuer country. As of the Petition Time, customer claims based on fiat currency totaled approximately $5.4 billion. Figure 2 provides an overview of the five fiat currencies with the largest amount of customer claims and the corresponding Debtors' holdings.[13]

Figure 2
Top Five Fiat Currencies by Face Value of Customer Claims and Category Total

Ticker	Name	Face Value of Customer Claims ($MM)	Face Value of Debtors' Holdings ($MM)
USD	U.S Dollar	$5,182.42	$601.88
EUR	Euro	$160.10	$77.87
AUD	Australian Dollar	$34.70	$3.69
GBP	Great British Pound	$17.66	$4.68
CAD	Canadian Dollar	$9.20	-$0.01
Other Fiat Currencies		$18.56	$38.77
Total Across 21 Fiat Currencies		$5,422.65	$726.89

Notes and Sources:
[1] Appendix C – Section C-I.B-C.

[13] I understand that the following stablecoins were indistinguishable from USD on the Exchanges: USDP, PAX_DEPRECATED, TUSD, USDC, BUSD, and WUSDC. Specifically, I understand that once a user deposited these stablecoins onto the exchange, they were treated as USD for purposes of a user's exchange balance. As a result, any balances for these stablecoins are included in the USD fiat balance and not in the stablecoin balances.

23. Consistent with my assignment, I determine the price of a unit of fiat currency in USD equivalent based on exchange rates prevailing as of the Petition Date. In my experience, global currency exchange markets are highly liquid, and converting fiat currency claims denominated in currency other than USD in an orderly manner would have no significant price impact on global exchange rates and would entail very low transaction costs.[14] I therefore do not assign any discount to fiat currency prices.

B. Stablecoins

24. A stablecoin is a type of digital asset designed to have a value that is pegged to a reference asset.[15] The reference asset can be fiat currency—most commonly, USD—or some other asset such as gold. Because of their price stability relative to the highly volatile mainstream cryptocurrencies (*e.g.*, Bitcoin and Ether), stablecoins are used in digital asset transactions that require stable stores of value for short periods of time.[16] For example, stablecoins can serve as a medium of exchange between cryptocurrencies, as collateral for margin trading on cryptocurrency exchanges, or as a means for transferring funds across jurisdictions.[17]

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[14] *See*, *e.g.*, "Investor Bulletin: Foreign Currency Exchange (Forex) Trading for Individual Investors," *U.S. Securities and Exchange Commission*, available at https://www.sec.gov/investor/alerts/forextrading.pdf ("The forex market is a large, global, and generally liquid financial market."). *See also* Jackson, James K, "Introduction to Financial Services: The International Foreign Exchange Market," *Congressional Research Service*, 2019, p. 1 ("These markets [international foreign exchange markets] are highly liquid as a result of extensive global communications systems and electronic trading venues that operate on a 24-hour basis").

[15] Hertig, Alyssa, "What Is a Stablecoin?" *CoinDesk*, August 8, 2023, available at https://www.coindesk.com/learn/what-is-a-stablecoin.

[16] Polizu, Cristina, Garg Anoop, and Miguel de la Mata, "Stablecoins: A Deep Dive into Valuation and Depegging," *S&P Global*, September 7, 2023, available at https://www.spglobal.com/en/research-insights/featured/special-editorial/stablecoins-a-deep-dive-into-valuation-and-depegging ("Polizu et. al (2023)") ("…stablecoins are meant to maintain a stable value, and therefore counter the high volatility of other crypto currencies…").

[17] Polizu et. al (2023) ("Stablecoins address the need for digital tokens that maintain a consistent value relative to a reference asset such as fiat currency (for example, US dollar). Stablecoins play an essential role in decentralized finance (DeFi) protocols, acting as a medium of exchange between other cryptocurrencies. They allow users to borrow against other crypto-assets, to hedge against a long position, to create a short position or to take out a

25. Stablecoins attempt to maintain a stable value relative to their reference asset through different mechanisms. The most widespread stablecoins, including Tether, which had a market capitalization of $68.4 billion as of the Petition Date, are pegged to USD, and are claimed to be backed one-to-one by liquid collateral.[18] Some stablecoins are pegged to other fiat currency, such as Turkish lira, Brazilian real, or Indonesian rupiah, and backed by collateral that is denominated in the corresponding fiat currency. There are also stablecoins that are collateralized by digital assets such as Bitcoin or Ether (*e.g.*, Dai), and those that are not collateralized at all but instead use algorithms that maintain stability by matching supply and demand for the stablecoin (*e.g.*, AMPL).[19]

26. Stablecoins that are pegged to the prices of conventional assets such as fiat currency or gold are typically redeemable for fiat currency, even when it is not clear whether they are 100

personal loan with an asset with stability closer to a strong fiat currency."). Bains, Parma, Arif Ismail, Fabiana Melo, and Nobuyasu Sugimoto, "Regulating the Crypto Ecosystem: The Case of Stablecoins and Arrangements," *International Monetary Fund*, Vol. 2002, No. 8, 2022, pp. 6-43 ("By their very nature, stablecoins are cross-border, and stablecoins denominated in one currency might be used in markets that use a different unit of account. Issuers might be headquartered in one jurisdiction and market their services globally.").

[18] "Tether USD (Historical Data)," *CoinGecko*, available at https://www.coingecko.com/en/coins/tether/historical_data?start=2022-11-11&end=2022-11-11#panel.

Polizu et al. (2023) ("This article analyzes five stablecoins that account for more than 90% of the $125 billion market cap as of June 2023, all of which are pegged to the US dollar ($1). … Tether (USDT): USDT is the largest stablecoin by market capitalization ($83 billion) and is pegged to the US dollar. … each token is backed by $1 in reserve assets (which include cash and cash equivalents, US Treasuries, money market funds, bitcoin, gold and other financial assets).").

Note that the quality of the assets backing Tether has been disputed in the past. *See*, e.g., Faux, Zeke, "Anyone Seen Tether's Billions," *Bloomberg*, October 7, 2021, available at https://www.bloomberg.com/news/features/2021-10-07/crypto-mystery-where-s-the-69-billion-backing-the-stablecoin-tether.

[19] Polizu et al. (2023) ("The price of algorithmic stablecoins is controlled by smart contracts that manage interest rates or the supply of an endogenous token. To date, these stablecoins have not scaled successfully and have experienced sudden collapses, such as that of Terra's UST stablecoin in May 2022.").

percent collateralized.[20] For example, each Tether can be redeemed for one USD;[21] similarly, each BiLira can be redeemed for one Turkish lira;[22] each Brazilian Digital Token can be redeemed for one Brazilian real.[23] Notably, investors redeemed over $20 billion in Tether during 2022, without significant disruptions to the stablecoin's price.[24] As I show in Exhibit 2, of the 29 stablecoins on which customer claims are based, 21 are, at least in theory, redeemable for fiat currency (and have not lost their peg), representing 99.6 percent of the face value of all customer stablecoin claims.[25] In an orderly liquidation of the Debtors' holdings of stablecoins commencing as of the Petition Time, the Debtors could therefore likely redeem these stablecoins for fiat currency and in turn

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[20] Mechanically, when a customer redeems the stablecoin, the redeemed stablecoin is destroyed ("burned") and the customer receives the underlying asset such as fiat currency or gold. George, Benedict, "What Does It Mean to Burn Crypto?" *CoinDesk*, May 11, 2023, available at https://www.coindesk.com/learn/what-does-it-mean-to-burn-crypto ("'Burning' crypto means permanently removing a number of tokens from circulation. This is typically done by transferring the tokens in question to a burn address, i.e. a wallet from which they cannot ever be retrieved. This is often described as destroying tokens. … In a similar way, algorithmic stablecoins automatically mint new tokens and burn them frequently to maintain their dollar-pegged value.").

[21] "Tether (USDT): A Complete Guide to Tether Crypto in 2023," *Tokenize.com*, available at https://www.tokize.com/en/crypto/tether-usdt ("When a buyer wishes to purchase USDT, they send US dollars to Tether Limited, the parent company responsible for managing Tether (USDT). Tether Limited then mints an equivalent quantity of USDT tokens and sends them to the user's wallet. The received US dollars are held in reserve, helping to maintain the parity ("peg"). The same thing works the other way around. That is, when a user wants to exchange their USDT for US dollars, they send their USDT tokens to Tether Limited, which then burns (or takes them out of circulation) the tokens before sending an equivalent amount in US dollars to the user's bank account or wallet."). "Tether FAQ's," *Tether*, available at https://tether.to/en/faqs ("Tether tokens (USD₮) are sometimes burned to reduce the number of outstanding tokens existing on a specific blockchain. These outstanding tokens could be from a customer's redemption of their USD₮ holdings for fiat currency. These redeemed and returned USD₮ could alternatively be held by Tether's treasury (thus out of circulation and not part of the total market capitalization), ready for future issuance only in response to new market demand.").

[22] Godbole, Omkar, "Lira-Backed TRYB Token Becomes World's Second-Largest Non-Dollar-Pegged Stablecoin," *CoinDesk*, September 1, 2023, available at https://www.coindesk.com/markets/2023/09/01/lira-backed-tryb-token-becomes-worlds-second-largest-non-dollar-pegged-stablecoin.

[23] "Brazilian Digital Token White Paper," *The Whitepaper Database*, available at https://www.allcryptowhitepapers.com/brazilian-digital-token-whitepaper.

[24] *See, e.g.*, "Tether Continues to Demonstrate Strength of Reserves, Reveals $700m Profits for Q4/2022 in Latest Attestation Report," *Tether*, February 9, 2023, available at https://tether.to/en/tether-continues-to-demonstrate-strength-of-reserves-reveals-dollar700m-profits-for-q42022-in-latest-attestation-report ("Not only were we able to smoothly execute over $21 billion dollars in redemptions during the chaotic events of the year, but Tether has on the other side issued over $10 billion of USD₮, an indication of continued organic growth and adoption of Tether.").

[25] Evaluating the quality of the assets backing these stablecoins is generally beyond the scope of my assignment.

exchange it into USD as necessary.[26] Since I do not apply any discount to fiat currencies, which are highly liquid, I do not apply an asset liquidation discount to the price of these stablecoins.[27]

27. I treat stablecoins that are not redeemable for fiat currency as any other coin or token that is potentially subject to an asset liquidation discount. In practice, I do not estimate an asset liquidation discount in excess of 10 percent for any non-redeemable stablecoin whose price is not stale as of the Petition Time,[28] and therefore do not apply an asset liquidation discount to their prices.

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[26] Two stablecoins—PAXG and XAUT—are reportedly redeemable for either gold or fiat currency. Holders of PAXG can "redeem [PAXG] for USD at current gold market prices at any time." Holders of XAUT can request that the issuer sell the gold on their behalf in the Swiss gold market for 25 basis point of the resulting cash proceeds. The Swiss gold market is "historically the world's largest physical gold market," so I do not expect Debtors to have difficulties converting their physical gold into fiat currency. *See* Notes 2-3 of Exhibit 2. "Swiss Gold Market," *Bullion Star*, available at https://www.bullionstar.com/gold-university/swiss-gold-market.

Three stablecoins—DAI, RSV, USDS—are reportedly redeemable for other stablecoins which in turn are redeemable for fiat currency.

HUSD, while in principle redeemable for other stablecoins, had lost its peg prior to the Petition Date, indicating that as of the Petition Time HUSD holdings would in practice no longer have been redeemable into stablecoin or fiat. *See* Exhibit 2.

[27] An exception to this rule is HUSD, whose price lost its peg prior to the Petition Date (indicating that the redemption mechanism failed for this stablecoin), and for which the Petition Time price I received is more than a month stale. I therefore set the price of HUSD to zero, as shown in Exhibit 6.

As shown in Exhibit 2, there are three redeemable stablecoins that had stale prices (*i.e.*, prices dating to more than a month before the Petition Date): IDRT, USDS, and ZUSD. I have not seen evidence that any of these three stablecoins depegged from their respective reference assets as of the Petition Date or since.

IDRT is pegged to the Indonesian rupiah ("IDR") and can be redeemed in IDR for a 0.5 percent fee. See "What Is the Fee to Redeem My IDRT to IDR?" *RupiahToken*, 2023, available at https://rupiahtoken.com/faq/berapa-biaya-pencairan-idrt-ke-idr. In Exhibit 6, I therefore assign a price to IDRT equal to 99.5 percent of the Petition Time IDR/USD exchange rate.

USDS is pegged to $1 and redeemable in other stablecoins, including USDC, which is widely used. Redeeming USDS in terms of USDC (which had a price of $1 as of the Petition Time) currently incurs a 0.5 percent fee. In Exhibit 6, I therefore assign a Petition Time price of $0.995 (= $1×(1 – 0.005)). *See* "Minting and Redeeming," *Sperax*, November 2023, available at https://docs.sperax.io/master/minting-and-redeeming.

ZUSD is redeemable in USD at no cost, and therefore in Exhibit 6 I assign a Petition Time price of $1. See "Fee Schedule," *GMO-Z.com Trust Company, Inc.*, 2023, available at https://stablecoin.z.com/fee-schedule.

[28] The most recent available price available to me for ANCT is from July 27, 2022. Since I have not seen any evidence that ANCT remained a marketable asset as of the Petition Time, and was not redeemable for fiat, I set its price to zero in Exhibit 6. I set the price of SAI to zero in Exhibit 6 for similar reasons.

28. Figure 3 summarizes the face value of five stablecoins in the Debtors' holdings that have the largest corresponding customer claims. Tether accounts for approximately 89.1 percent of customer claims based on stablecoins, with the remainder including Pax Gold and Tether Gold (whose values are pegged to gold prices and backed by physical gold reserves), BiLira (pegged to Turkish lira and backed by fiat currency), and BRZ (pegged to Brazilian real and backed by fiat currency).[29]

Figure 3
Top Five Stablecoins by Face Value of Customer Claims and Category Total

Ticker	Name	Face Value of Customer Claims ($MM)	Face Value of Debtors' Holdings ($MM)
USDT	Tether	$825.74	$114.13
PAXG	Pax Gold	$37.91	$1.69
BRZ	Brazilian Digital Token	$17.87	$21.73
XAUT	Tether Gold	$17.36	$16.95
TRYB	Bilira	$12.52	$2.75
Other Stablecoins		$14.84	$74.32
Total Across 29 Stablecoins		$926.24	$231.57

Notes and Sources:
[1] Appendix C – Section C-I.B-C.

C. Futures

29. $424.2 million of customer claims are based on futures contracts.[30] I do not apply an asset liquidation discount to these claims because of the way that futures operate. Here, I briefly

[29] *See* Exhibit 2.

[30] The $424.2 million value represents the notional net positions size of customer claims, *i.e.*, the difference between the notional sizes of long and short futures positions (Figure 4). The notional size of future position shows the value of the underlying asset at its spot price. For example, a Bitcoin future with 10x leverage trading at $1,000 has a notional size of $10,000.

describe how futures work in general, how they are different in cryptocurrency markets, and what it means to use information about profit and loss (P&L) to value futures positions.

30. Futures contracts represent opposing bets by two parties about the future price of an asset, where one party takes a long position (a bet that the price will increase) and one takes a short position (a bet that the price will decline).[31] A futures position allows a trader to lock in a price today for a specified underlying asset of a specified amount at a specified date ("settlement date") in the future when all cash flows are settled, and the final P&L is realized. There is no transfer of cash between long and short parties at the initiation of the futures contract. In other words, the value of the futures contract at initiation is zero.[32] However, to trade futures, a customer must post collateral in a margin account. As the price of the asset moves up or down, the customer's P&L changes. The exchange has a minimum margin, called the "maintenance margin." Every day, the exchange calculates the P&L in a "mark-to-market" ("MTM") exercise. The customer can keep their position so long as the MTM indicates that their margin exceeds the maintenance level.[33]

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[31] Bodie, Zvi, Alex Kane, and Alan Marcus, *Investments*, McGraw-Hill Education, 2018, 11th ed., p. 51 ("A futures contract calls for delivery of an asset (or in some cases, its cash value) at a specified delivery or maturity date for an agreed-upon price, called the futures price, to be paid at contract maturity. The *long position* is held by the trader who commits to purchasing the asset on the delivery date. The trader who takes the *short position* commits to delivering the asset at contract maturity.")

[32] Bodie, Zvi, Alex Kane, and Alan Marcus, *Investments*, McGraw-Hill Education, 2018, 11th ed., p. 748 ("The trader in the long position is said to "buy" a contract; the short-side trader "sells" a contract. The words buy and sell are figurative only because a contract is not really bought or sold like a stock or bond; it is entered into by mutual agreement. At the time the contract is entered into, no money changes hands."); Ritchken, Peter, *Derivative Markets: Theory, Strategy, and Applications*, HarperCollins, 1996, p. 35 ("Like the price of a forward contract, the futures price is established so that its initial value is zero.").

[33] Bodie, Zvi, Alex Kane, and Alan Marcus, *Investments*, McGraw-Hill Education, 2018, 11th ed., p. 755 ("If a trader accrues sustained losses from daily marking to market, the margin account may fall below a critical value called the maintenance margin. If the value of the account falls below this value, the trader receives a margin call, requiring that the margin account be replenished or the position be reduced to a size commensurate with the remaining funds.")

31. A conventional futures contract has a fixed maturity date, so the futures price must converge to the spot price at the expiration date.[34] A variant on this model is a "perpetual futures contract," which has no fixed maturity date.[35] While never meaningfully taken up in conventional markets, perpetual futures were adapted to cryptocurrency markets, where they became the dominant derivative, and were among the most actively traded products on the Exchanges.[36] To keep prices from deviating too much from the spot price, perpetual futures use a funding rate mechanism in which the two parties in the contract make periodic payments depending on whose bet is paying off.[37] FTX recalculated the funding rate every hour, 24 hours a day.[38]

32. FTX also calculated the P&L in its MTM exercise every 30 seconds and did not permit any account losses to be carried forward.[39] In other words, the maintenance margin was

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[34] Ritchken, Peter, *Derivative Markets: Theory, Strategy, and Applications*, HarperCollins, 1996, p. 30 ("Before settlement, futures and spot prices need not be the same. The difference between the prices—the basis of the futures contract—converges to zero as the contract approaches maturity.").

[35] This variant was, to my knowledge, first proposed by Shiller (1993). Shiller, Robert J, "Measuring asset values for cash settlement in derivative markets: hedonic repeated measures indices and perpetual futures." *The Journal of Finance*, Vol. 48, No. 3, 1993, pp. 911-931 ("Shiller (1993)").

[36] He, Songrun, Asaf Manela, Omri Ross, and Victor von Wachter, "Fundamentals of Perpetual Futures," *SSRN Working Paper*, 2023, pp. 1-50.

[37] Ackerer, Damien, Julien Hugonnier, and Urban Jermann, "Perpetual Futures Pricing," *SSRN Working Paper*, 2023, pp. 1-30. "Complete Future Specs," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20210506184657/https://help.ftx.com/hc/en-us/articles/360024780511-Complete-Futures-Specs ("Every hour, each perpetual contract has a funding payment where longs pay shorts if perpetual is trading at a premium to the index, and shorts pay longs if trading at a discount to the index. This funding payment is equal to TWAP ((Future - Index) / Index) / 24. This payment is added/deducted to your account's USD balance."); "Profit & Loss Calculation," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20210506182327/https:/help ftx.com/hc/en-us/articles/360027668732-Profit-Loss-Calculation ("Note that if you put on a position in a perpetual future, your PnL will be increased/decreased by the total funding payments you pay while holding the position. Each hour, there is a funding payment from longs to shorts of position size * (TWAP of futures price - TWAP of index) / 24.").

[38] "Settlement & Delivery," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20210324040455/https:/help ftx.com/hc/en-us/articles/360027668752-Settlement-Delivery ("…perpetual futures have funding payments every hour. Specifically, every hour, we measure the 1 hour TWAP of the perpetual future and the 1 hour TWAP of the underlying index:").

[39] "Profit & Loss Calculation," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20210506182327/https:/help ftx.com/hc/en-us/articles/360027668732-Profit-Loss-Calculation ("Every thirty seconds (unless there are active liquidations), we [FTX] automatically turn all unrealized pnl into realized pnl").

met every 30 seconds or else the account was liquidated. Due to the high-frequency updating together with the nature of futures contracts, I would expect customer P&Ls on FTX to closely reflect futures prices at any snapshot in time. Figure 4 summarizes the notional net position of the top five futures contracts that have the largest customer claims.[40]

Figure 4
Top Five Futures Contracts by Notional Net Position of Customer Claims and Category Total

Ticker	Name	Notional Net Position of Customer Claims ($MM)
BTC-PERP	Bitcoin - Perpetual	$191.57
ETH-PERP	Ethereum - Perpetual	$164.94
BTC-1230	Bitcoin - Fixed Date of Maturity [12/30/2022]	$13.06
ADA-PERP	Cardano - Perpetual	$11.60
BITW-1230	Bitwise 10 Crypto Index Fund - Fixed Date of Maturity [12/30/2022]	$11.49
Other Futures Contracts		$31.54
Net Total Across 295 Futures Contracts		$424.20

Notes and Sources:
[1] Notional Net Position of Customer Claims represents the net notional value of positions across customers as of Petition Time.
[2] Appendix C – Section C-I.B-C.

33. In practice, I understand from A&M that the P&L for futures were held in fiat currency-denominated accounts associated with the customer rather than with the particular asset.[41] That is, the claim of any particular customer would simply be the value of their fiat-

[40] Since futures contracts represent two opposing bets, long and short, the net size of futures positions is approximately zero. However, the net sizes of customer claims for some futures are positive (negative) since FTX related parties, whose claims are not marked as scheduled, held corresponding short (long) positions.

[41] "Derivative Positions," *FTX.com*, available at https://support.ftx.com/hc/en-us/articles/19464725450260-Derivative-Positions ("In the initial customer claims schedule filed on March 15, 2023, all open derivative positions were assumed to be closed and included in the USD balance. This is consistent with ordinary course exchange operations and what you would have seen on your account when the exchange was previously operational.").

denominated account. I understand that calculating these values in the context of the accounting conventions of the customer claims requires the Petition Time prices of open futures positions.[42] I do not estimate an asset liquidation discount for futures.

D. Leveraged Tokens

34. There is a similar intuition for leveraged tokens, where there is no direct parallel in conventional markets. These are managed leveraged positions created by FTX that allowed investors to bet on the success of tokens or indices. Leveraged tokens are directly linked to the daily returns of an underlying asset and permit simplified leveraged exposure without a margin account.[43] For example, an ETHBULL leveraged token represents a long position in ETH with 3x leverage. If ETH goes up one percent, ETHBULL moves up three percent. Conversely, if ETH goes down one percent, ETHBULL moves down three percent. FTX created leveraged tokens by taking either long or short positions in perpetual futures. For example, if a customer buys $1 of ETHBULL, FTX takes a long position in $3 of ETH perpetual futures and posts $1 in a margin account, so the account is 3x long ETH. When customers redeemed their leveraged tokens, FTX would destroy the token and close out the corresponding futures positions, crediting the account with the original investment, plus or minus any returns.[44]

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[42] "Derivative Positions," *FTX.com*, available at https://support.ftx.com/hc/en-us/articles/19464725450260-Derivative-Positions ("In the amended customer claims schedule filed on June 27, 2023, all open derivative positions as of Petition Date and time (November 11, 2022) are broken out into separate line items to show quantities of contracts held by derivative ticker. … The full market price of any open derivative position as of the Petition Date (November 11, 2022) is netted from the USD balance so it can be shown separately on its own line item. … The above actions do not change or impact the overall value of your claim.").

[43] "Leveraged Token Walkthrough [READ THIS]," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20210217184042/https://help.ftx.com/hc/en-us/articles/360032509552-Leveraged-Token-Walkthrough-READ-THIS-.

[44] "Leveraged Token Walkthrough [READ THIS]," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20210217184042/https://help.ftx.com/hc/en-us/articles/360032509552-Leveraged-Token-Walkthrough-READ-THIS- ("You can also redeem leveraged tokens for their net asset value. To do

35. FTX rebalanced leveraged tokens once per day or whenever they were 33 percent higher than the target.[45] For example, the ETHBULL described above was reset daily to 3x the value of ETH. FTX also reinvested profits, increasing the account's position size after a positive daily return or reducing the size after a loss.[46] There is a one-to-one mapping between futures and the leveraged token; underneath the leveraged token there is a futures P&L account.[47] Further, the customer accounts can be described as MTM daily. Figure 5 summarizes the five leveraged tokens in the Debtors' holdings that have the largest corresponding customer claims.

that, you can send your $10,000 of ETHBULL back to FTX, and redeem it. This will destroy the token; cause the ETHBULL account to sell back the $30,000 worth of futures; and credit your account with $10,000").

[45] "FTX Leveraged Token Pricing, Value, and Rebalancing." *Poloniex*, available at https://support.poloniex.com/hc/en-us/articles/360046773453-FTX-Leveraged-Token-Pricing-Value-and-Rebalancing.

[46] "Leveraged Token Walkthrough [READ THIS]," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20210217184042/https://help.ftx.com/hc/en-us/articles/360032509552-Leveraged-Token-Walkthrough-READ-THIS- ("Leveraged tokens reinvest their profits. That means that, if they have positive PnL, they'll increase their position size. … Leveraged tokens reduce their risk if they have negative PnL to avoid liquidations. So, if they have negative PnL, they'll reduce their position size").

[47] "Leveraged Token Walkthrough [READ THIS]," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20210217184042/https://help.ftx.com/hc/en-us/articles/360032509552-Leveraged-Token-Walkthrough-READ-THIS- ("Each leveraged token gets its price action by trading FTX perpetual futures. For instance, say that you want to create $10,000 of ETHBULL. To do so you send in $10,000, and the ETHBULL account on FTX buys $30,000 worth of ETH perpetual futures. Thus, ETHBULL is now 3x long ETH. … FTX then sends orders in the associated FTX perpetual futures orderbook to rebalance (e.g. ETH-PERP for ETHBULL/ETHBEAR)").

Figure 5
Top Five Leveraged Tokens by Face Value of Customer Claims and Category Total

Ticker	Name	Face Value of Customer Claims ($MM)
ETHBULL	3x Long Ether Token	$1.75
BULL	3x Long Bitcoin Token	$1.44
BEAR	3x Short Bitcoin Token	$0.94
MATICBULL	3x Long MATIC Token	$0.50
BNBBULL	3x Long Binance Coin Token	$0.45
Other Leveraged Tokens		$3.26
Total Across 248 Leveraged Tokens		$8.33

Notes and Sources:
[1] Appendix C – Section C-I.B-C.

36. Given that underneath the leveraged token there is a futures P&L account, I treat leveraged tokens similarly to how I treat futures and do not estimate an asset liquidation discount for leveraged tokens.

E. Tokenized Stocks

37. Tokenized stocks are derivatives that aim to mimic the price movements of publicly traded stocks.[48] Depending on the platform, tokenized stocks may or may not have collateral behind them.[49]

38. I understand that the tokenized stocks claimed by FTX customers could be traded on the Exchanges but were not otherwise tradable outside of the Exchanges. Based on my review

[48] "Tokenized Stock Products Terms of Service," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20221111091233/https://ftx.com/equities_terms/tokenized-stock-product-tos.pdf.

[49] "Billionaire Bitcoin Investor Explains Why Tokenized Stocks Are A Big Deal...Outside America," *Forbes*, May 11, 2021, available at https://www.forbes.com/sites/javierpaz/2021/05/11/the-future-of-tokenized-stockswhat-they-can-replace-and-what-to-watch-out-for/?sh=db4b00b275e5.

of documentation, each of the tokenized stocks offered by the Exchanges was claimed to be collateralized by the underlying stock.[50] I have not seen documents showing the extent to which these tokenized stocks were collateralized in practice, if at all.[51] Therefore, I consider customer claims associated with tokenized stocks to amount to a financial contract between a customer and FTX to track a stock price.[52] In other words, the price of tokenized stocks on the Exchanges as of the Petition Time reflect fiat claims by customers, similar to the P&L associated with futures claims, and I do not assign an asset liquidation discount to tokenized stocks.[53]

39. As of the Petition Time, there were 57 tokenized stocks on the Exchanges on which customer claims are based, with a total of $55.4 million in customer claims associated with them.[54] Figure 6 reports the five tokenized stocks with the largest customer claims and the corresponding Debtors' holdings.

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[50] I understand that as of May 2021, Mr. Bankman-Fried represented that FTX's tokenized equity offerings were fully collateralized but that FTX's approach to structuring tokenized equity changed around December 2021. "Billionaire Bitcoin Investor Explains Why Tokenized Stocks Are A Big Deal...Outside America," *Forbes*, May 11, 2021, available at https://www.forbes.com/sites/javierpaz/2021/05/11/the-future-of-tokenized-stockswhat-they-can-replace-and-what-to-watch-out-for/?sh=db4b00b275e5.

[51] Establishing the extent to which tokenized stocks were in fact collateralized is beyond the scope of my assignment.

[52] "Key Information Document (Fractional Stocks)," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20221111091233/https://ftx.com/equities_terms/tokenized-stock-product-tos.pdf.

[53] To the extent that some subsets of tokenized stocks were in fact collateralized by the publicly traded stocks, I would not expect the sale of the collateral in an orderly liquidation commencing at the Petition Time to have substantial price impact on the prices of the publicly traded stocks.

[54] I note that the ticker of some tokenized stocks included the suffix "PRE." I understand that these tokenized stocks are defunct as they were created after corporate events such as stock splits during which FTX renamed existing tokenized stocks with the "PRE" suffix and automatically converted customer positions in these "PRE" tokenized stocks into newly created tokenized stocks whose tickers did not have the "PRE" suffix. After this automatic conversion, the "PRE" tokenized stock would be defunct and delisted. For example, during Google's July 2020 20:1 stock split, FTX first renamed the GOOGL tokenized stock to GOOGLPRE, then created a new GOOGL ticker, to which all GOOGLPRE positions were automatically converted at a 20:1 rate. After this automatic conversion, FTX delisted the GOOGLPRE tokenized stock. See "GOOGL Stock Split," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20220916140105/https://help ftx.com/hc/en-us/articles/7835057290772-GOOGL-Stock-Split. In Exhibit 6, I therefore assign a price of zero to tokenized stocks with "PRE" suffixes.

Figure 6
Top Five Tokenized Stocks by Face Value of Customer Claims and Category Total

Ticker	Name	Face Value of Customer Claims ($MM)
GBTC	Grayscale Bitcoin Trust Tokenized Stock FTX	$11.50
NOK	Nokia Tokenized Stock[3]	$8.55
TSLA	Tesla Tokenized Stock Bittrex	$7.70
SPY	SPDR S&P 500 ETF Tokenized Stock FTX	$3.74
ETHE	Grayscale Ethereum Trust Tokenized Stock FTX	$2.87
Other Tokenized Stocks		$21.08
Total Across 57 Tokenized Stocks		$55.43

Notes and Sources:
[1] Appendix C – Section C-I.B-C.

F. Spot+ Derivatives

40. I understand from FTX that Spot+ derivatives were derivatives offered by FTX EU that aimed to mimic the price movements of digital assets such as coins and tokens. Spot+ derivatives are analogous to tokenized stocks in that both are derivatives specific to the Exchanges and use financial contracts to track the price of the underlying asset. I therefore treat Spot+ derivatives in the same manner as tokenized stocks and do not apply an asset liquidation discount to their Petition Time prices.

41. As of the Petition Time, there were 200 Spot+ derivatives on FTX EU on which customer claims are based, associated with a total of $24.5 million in customer claims.[55] Figure 7

[55] This 200 Spot+ derivatives correspond to derivatives for which the underlying was a digital asset which is potentially subject to an asset liquidation discount in my framework. FTX EU also offered Spot+ derivatives for digital assets for which I do not calculate an asset liquidation discount, for example Spot+ derivatives on

illustrates the five Spot+ derivatives with the largest customer claims. I note that 46 of the 200 Spot+ derivatives had underlying digital assets to the prices of which I estimate an asset liquidation discount in excess of 10 percent. The face value of the customer claims associated with these 46 Spot+ derivatives was $216 thousand.

Figure 7
Top Five Spot+ Derivatives by Face Value of Customer Claims and Category Total

Ticker	Name	Face Value of Customer Claims ($MM)
BTC	Bitcoin	$15.58
ETH	Ether	$3.77
LINK	Chainlink	$0.76
MANA	Decentraland	$0.61
SOL	Solana	$0.55
Other Spot+ Derivatives		$3.28
Total Across 200 Spot+ Derivatives		$24.54

Notes and Sources:
[1] Appendix C – Section C-I.B-C.

G. FTX Equity Claims and FTT

42. FTX equity represents an ownership interest in FTX's corporate entities. From an economic perspective, the value of equity ownership derives from claims on the corporation's future cash flows. As I discuss further in Section IV.C, equity claims typically have no value in Chapter 11 cases unless creditor claims are paid in full.[56]

stablecoins such as Tether. I present these Spot+ derivatives in combination with the underlying assets in the Figures and associated text in this report.

[56] Baird, Douglas G. and Robert K. Rasmussen, "Chapter 11 at Twilight," Stanford Law Review, 2003, pp. 673-699, at p. 692 ("When there is an asset sale, the proceeds are often less than what the most senior creditors are

43. FTT is a token that formerly offered its holders certain benefits that flowed from trading or investment activity on the Exchanges. It is an example of an "exchange token" intended to be useful for exchange customers created by a company responsible for an exchange; other examples are Binance's BNB and KuCoin's KCS.[57] In this way, it can be identified as a utility token as described in Howell et al. (2020).[58] FTT accrued value in two main ways: (i) weekly buybacks of FTT in which FTX would burn tokens using 33 percent of trading fees; and (b) benefits for trading on the Exchanges, including discounts on trading fees and interest on staked FTT.[59]

44. More specifically regarding (b), FTT provided 11 tiers of discounts on trading fees ranging from three percent if the customer held at least $100 of FTT to 60 percent if the customer held at least $5 million.[60] FTT also provided at least five ancillary benefits for trading on the Exchanges. First, holders of FTT received rebates for trading over-the-counter (OTC) with

owed. Those junior to them are often wiped. … [E]ven when we do not have asset sales in large Chapter 11 cases, equity holders typically get wiped out").

[57] "What Is BNB," *Binance*, June 9, 2023, available at https://academy.binance.com/en/articles/what-is-bnb; "What Is KuCoin Token (KCS)?" *KuCoin*, available at https://www.kucoin.com/kcs.

[58] Howell, Sabrina T., Marina Niessner, and David Yermack, "Initial Coin Offerings: Financing Growth with Cryptocurrency Token Sales," *The Review of Financial Studies*, Vol. 33, No. 9, 2020 ("Howell et al. (2020)"), pp. 3925-3974, at p. 3926.

[59] "FTT Token White Paper," *FTX*, available at https://whitepaper.io/document/502/ftx-token-whitepaper, p. 7 ("One third of all fees generated on FTX will be used for an FTT repurchase, until at least half of all FTT is burned… Customers who hold a certain amount of FTT for a period of time will receive lower FTX futures fees… Customers who hold enough FTT will receive rebates from all of their OTC trading on FTX."). *See also*, "FTX (FTT): Its Downfall & The Launch of FTX 2.0," *ByBit Learn*, May 29, 2023, available at https://learn.bybit.com/crypto/what-is-ftt ("The repurchase of FTT was made possible by using 33% of the trading fees generated on FTX.") and Knight, Oliver, "FTX Has Made $34M in Trading Fees Since Recent FTT Token Burn Despite Withdrawal Freeze," *CoinDesk*, November 10, 2022, available at https://www.coindesk.com/business/2022/11/10/ftx-has-made-34m-in-trading-fees-since-recent-ftt-token-burn-despite-withdrawal-freeze ("FTX has allocated 33% of all trading-fee revenue to burning the FTT token on a weekly basis.").

[60] "FTX Token (FTT) FAQ," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20210301233012/https:/help ftx.com/hc/en-us/articles/360027645972-FTX-Token-FTT-FAQ.

Alameda Research, the trading firm associated with FTX.[61] Second, FTT served as a leveraged token, with FTX offering 3x leverage with no margin.[62] Third, FTT holders received free ETH withdrawals up to a certain amount.[63] Fourth, it was possible to lock FTT tokens in a pool to earn certain benefits, such as allocations of SRM (the token created by the Serum exchange) during SRM airdrops.[64] This was termed "FTT staking," though it did not support a blockchain's consensus mechanism, which is usually the case when staking coins such as ETH.[65] Finally, FTX sometimes offered existing holders airdrops of new FTT tokens.[66] Thus, the value of FTT was tied to the value of FTX; it would be worth more if FTX attracted more trading activity, because users would then demand FTT to benefit from the rewards.

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61 "FTT Token White Paper," *FTX*, available at https://whitepaper.io/document/502/ftx-token-whitepaper**,** p. 7 ("Customers who hold enough FTT will receive rebates from all of their OTC trading on FTX."). This was a means to trade without having price impact made possible by trading directly with Alameda.

62 "About FTX Token," *CoinMarketCap*, available at https://coinmarketcap.com/currencies/ftx-token ("Another feature of the FTT are leveraged tokens, which allow traders to put leveraged positions without the need to trade on margin. If a trader wants to short Bitcoin with 3x leverage, they can simply buy a 3x short Bitcoin leveraged token on FTX.").

63 "FTX (FTT): Its Downfall & The Launch of FTX 2.0," *ByBit Learn*, May 29, 2023, available at https://learn.bybit.com/crypto/what-is-ftt ("FTT holders could also stake the token, which entitled them to free withdrawals of ERC-20 tokens from the FTX platform.").

64 In an "airdrop," tokens are given to community members for free, usually to encourage participation and scaling of a project or platform.

65 "How to Buy FTX Token (FTT)," *ByBit*, available at https://bybit.com/en/learn/crypto/buy-ftx-token/ ("FTT is an Ethereum-based ERC20 token issued and backed by the FTX exchange. It's used extensively on the FTX platform for staking, discounted trading, and to provide collateral for leveraged trading products.").

66 Novella, George Neo, "How to Qualify for FTX Token (FTT) Airdrop: The Insider's Guide," *Medium*, December 1, 2023, accessed December 6, 2023, available at https://medium.com/@JasonNeoNovella13/how-to-claim-ftx-token-ftt-airdrop-simplifying-the-process-000f82673ecc ("FTX Token (FTT) airdrops are special events where free tokens are given to existing token holders. They're a way for crypto projects to reward their loyal community members.").

45. As I illustrate in Figure 8, customer claims included $416.6 million in FTT,[67] and $310.3 million in FTX equity claims, measured at unadjusted face value[68] as of the Petition Time.[69] These unadjusted values do not consider the valuation impact of these Chapter 11 Cases, nor the fact that, as I understand from Counsel, FTT is not expected to play any role going forward in the event there is a sale of the Exchanges' assets. As I further explain in Section IV.C, under these assumptions in my opinion the fundamental value of these assets is zero.

Figure 8
FTT and FTX Equity Claims by Face Value of Customer Claims

Ticker	Name	Face Value of Customer Claims ($MM)	Face Value of Debtors' Holdings ($MM)
FTT	FTX Token	$406.67	$722.47
FTX_EQUITY	FTX Equity	$187.51	$0.00
FTX_EQUITY_STRIKE-2.28_VEST-2022_EXPIRE-2030	FTX Equity Options	$111.63	$0.00
FTT_CUSTOM	FTT Custom Token	$9.34	$0.00
FTX_EQUITY_OPTIONS_PER_AWARD_AGREEMENTS_PENDING_MAY_2021	FTX Equity Options	$8.16	$0.00
Other FTX Equity Claims and Versions of FTT		$3.58	$0.00
Total Across 13 FTX Equity Claims and FTT		$726.90	$722.47

Notes and Sources:
[1] Appendix C – Section C-I.B-C.

H. Remaining Cryptocurrencies and Tokens

46. The remaining digital assets include cryptocurrencies and tokens, some of which are staked or wrapped. Unlike futures, leveraged tokens, or tokenized stocks, the remaining digital

[67] Customer claims of FTT include FTT, FTT_CUSTOM, FTT_LOCKED, FTT_R3, and FTT options.

[68] I understand from FTX that the unadjusted FTX equity ticker pricing in the Exchange Order Book was based on a hard coded value that was manually adjusted from time to time.

[69] Including customer claims of FTT's _CUSTOM and _LOCKED versions, as well as FTT and FTX Equity Options.

assets would need to be sold if the Debtors were to liquidate their holdings to satisfy customer claims. In an orderly liquidation commencing as of the Petition Time, certain digital assets would likely have been sold at average prices below the market prices prevailing as of the Petition Time. This "asset liquidation discount" reflects that in certain illiquid digital asset markets, the sale of the Debtors' holdings would have likely impacted the market price. The methodology for estimating the asset liquidation discount is described in detail in Section IV.A and Appendix C of this report.

47. In addition, certain digital assets were subject to temporary restrictions on marketability. For these non-marketable digital assets, I apply a DLOM in addition to any asset liquidation discount. The methodology for estimating the DLOM is described in detail in Section IV.B and Appendix C of this report.

1. Wrapped Tokens

48. A wrapped token provides a means to trade a coin native to one blockchain on a different blockchain. Each wrapped token refers to (*i.e.*, represents) a specific coin on the native blockchain.[70] Wrapped tokens were created to overcome the fact that blockchains are not interoperable. For example, an owner of BTC cannot directly transact with it on the Ethereum blockchain, where the native coin is ETH. To address this problem, Kyber Network, BitGo, and Republic Protocol launched Wrapped Bitcoin (WBTC) in January 2019. Subsequently, wrapped tokens were developed for other native coins.

[70] Caldarelli, Giulio, "Wrapping Trust for Interoperability: A Preliminary Study of Wrapped Tokens," *Information*, Vol. 13, No. 6, 2022 ("Caldarelli (2022)"), pp. 1-25, at p. 1.

49. The intrinsic value of the wrapped token is tied to the right to redeem it for the underlying asset.[71] Hence, in an orderly liquidation, a wrapped token can be first unwrapped into the underlying native coin and then liquidated. Therefore, the appropriate asset liquidation discount to apply to the price of a wrapped token is the same as the asset liquidation discount for the underlying digital asset.[72]

50. Figure 9 lists the five wrapped tokens on which customer claims are based. The face value of the total customer claims associated with these wrapped tokens was $35.5 million, of which $32.7 million was Wrapped Bitcoin.

Figure 9
Wrapped Tokens by Face Value of Customer Claims

Ticker	Name	Face Value of Customer Claims ($MM)	Face Value of Debtors' Holdings ($MM)
WBTC	Wrapped Bitcoin	$32.67	$27.94
WFLOW	Wrapped Flow	$1.92	$0.00
WAXL	Wrapped Axelar	$0.89	$0.00
RBTC	Rootstock Smart Bitcoin	+$0.00	$0.05
WAVAX	Wrapped Avalanche	+$0.00	$0.20
RENBTC	Ren Protocol Bitcoin	+$0.00	$0.04
MAID	MaidSafeCoin	+$0.00	$0.00
Total Across 7 Wrapped Coins		$35.47	$28.23

Notes and Sources:
[1] Appendix C – Section C-I.B-C.

[71] Caldarelli (2022), at p. 16.

[72] In practice, no wrapped tokens are affected by my calculated asset liquidation discount.

2. Staked Coins

51. Staking refers to the practice of voluntarily locking up a coin to support a blockchain's operation in exchange for a reward.[73] In particular, when a blockchain uses a "proof of stake" consensus mechanism to verify and secure transactions, it requires validators to post coins as collateral (*i.e.*, stake them) to ensure compliance with the blockchain's rules.[74] The staked coins can usually be withdrawn (or "unstaked") at the discretion of the coin holder albeit with some delay (often, a matter of days).

52. Various blockchains have instituted certain minimum thresholds for coin holders to function as validators.[75] In case coin holders do not meet this threshold, but still wish to earn staking rewards, they can participate in staking through delegation. Through this process, they can delegate their coins to an existing validator or staking pool and receive a proportionate share of the rewards.[76]

53. Lido, Marinade and Tortuga Finance are examples of staking pools.[77] In exchange for staking coins with these staking pools, coin holders receive a liquid staking token, which can

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[73] Cong, Lin William, Zhiheng He, and Ke Tang, "The Tokenomics of Staking," *SSRN Working Paper*, 2023, pp. 1-45.

[74] Hussein, Ziad, May A. Salama, and Sahar A. El-Rahman, "Evolution of blockchain consensus algorithms: a review on the latest milestones of blockchain consensus algorithms," *Cybersecurity*, 2023, pp. 1-22, at p. 10.

[75] "What is proof of stake?" *McKinsey and Company*, available at https://www mckinsey.com/featured-insights/mckinsey-explainers/what-is-proof-of-stake. *See* "What is staking?" *Ethereum*, available at https://ethereum.org/en/staking ("Staking [on Ethereum] is the act of depositing 32 ETH to activate validator software.").

[76] *See "*Staking Pool," *Binance Academy*, available at https://academy.binance.com/en/glossary/staking-pool ("A staking pool allows multiple stakeholders (or bagholders) to combine their computational resources as a way to increase their chances of being rewarded. In other words, they unite their staking power in the process of verifying and validating new blocks, so they have a higher probability of earning the block rewards"). *See also* Cong, Lin William, Zhiheng He, and Ke Tang, "Staking, Token Pricing, and Crypto Carry," *Frank Hawkins Kenan Institute of Private Enterprise Working Paper*, 2022, pp. 1-61, at p. 59.

[77] *See* "Lido: Introduction," *Lido Docs*, available at https://docs.lido fi; "Liquid Staking on Aptos," *Tortuga Finance*, available at https://docs.tortuga.finance/product-docs/readme/liquid-staking-on-aptos; "Welcome to Marinade," *Marinade*, available at https://docs marinade.finance.

be deployed as collateral in decentralized finance applications.[78] These liquid staking tokens are fungible when issued by the same liquidity provider and can be redeemed at any time for the original coin.[79] A liquid staking token can be converted to the original coin either by selling it at the market rate or redeeming it. In a redemption, the original coin along with the rewards will be available after a certain period of time.[80]

54. I therefore treat liquid staked tokens in a similar manner as wrapped tokens. In an orderly liquidation, the liquid staked token can be unstaked and redeemed for the underlying coin. Therefore, in such cases, the appropriate asset liquidation discount to apply to the price of a staked coin would be the same as the asset liquidation discount for the underlying coin.

55. Figure 10 lists the four staked coins on which customer claims are based. Lido Staked Ether can be unstaked within one to five days.[81] Lido Staked Solana can be unstaked within

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78 Scharnowski, Stefan and Hossein Jahanshahloo, "The economics of liquid staking derivatives: Basic determinants and price discovery," *SSRN Working Paper*, 2023, pp. 1-40, at p. 1 ("[L]iquid staking tokens…are derivatives representing a share of staked tokens in proof-of-stake (PoS) blockchains… These liquid staking tokens can then be traded or used for other purposes in decentralized finance (DeFi) such as collateral in DeFi lending platforms.").

79 Tzinas, Apostolos and Dionysis Zindros, "The Principal-Agent Problem in Liquid Staking," *Cryptology ePrint Archive*, 2023, pp. 1-22, at p. 4 ("Tzinas, Apostolos, and Zindros, Dionysis (2023)") ("During the deposit, a new derivative asset is minted, which is given to the depositor as a claim to the delegated stake held by the liquid staking contract. Such derivative tokens, when issued from the same liquid staking contract, are fungible with one another… At any time, the derivative asset holder can *redeem* their derivative asset. During redemption, the contract burns the holder's derivative assets and returns the respective assets to the holder.").

80 Tzinas, Apostolos, and Zindros, Dionysis (2023), at p. 17. *See* "What is mSOL," *Marinade*, available at https://docs.marinade finance/getting-started/what-is-msol ("mSOL is a rewards-accruing liquid staking token. This means that after each Solana epoch (2-3 days), its value is recalculated based on the staking rewards earned by the Marinade Stake Pool… As the protocol cannot mint new mSOL without SOL being exchanged for them, only the *total staked* amount is going up (for any new mSOL minted, the same amount of SOL, at the current price of mSOL, has to be staked and also joins the *total staked* amount). This means that the price of mSOL is going up each epoch relative to SOL as long as staking rewards are distributed for the SOL staked in the protocol.").

81 "Withdrawals," *Lido*, available at https://stake.lido.fi/withdrawals/request.

two to three days.[82] Marinade Staked Solana can be unstaked within two to six days.[83] Unstaking Tortuga Finance Aptos may take up to 30 days.[84] Customer claims based on Tortuga Finance Aptos are *de minimis* at approximately $4,130. Therefore, any potential DLOM associated with the time to unstake Debtors' holdings of these wrapped tokens in the context of an orderly liquidation that commenced at the Petition Time would likely be minimal. I therefore do not assess any DLOM associated with these claims.

Figure 10
Staked Coins by Face Value of Customer Claims

Ticker	Name	Face Value of Customer Claims ($MM)	Face Value of Debtors' Holdings ($MM)
STETH	Lido Staked Ether	$42.64	$2.58
STSOL	Lido Staked Solana	$3.73	$10.15
MSOL	Marinade Staked Solana	$0.56	$5.37
TAPT	Tortuga Finance Aptos	+$0.00	$1.90
Total Across 4 Staked Coins		$46.93	$20.00

Notes and Sources:
[1] Appendix C – Section C-I.B-C.

82 "Stake Solana," *Lido*, available at https://solana.lido fi.

83 "FAQ," *Marinade*, available at https://docs.marinade.finance/getting-started/faq ("With Marinade, you can stake SOL and/or unstake SOL immediately. There is no waiting time with our liquid staking solution. However, immediate unstake will involve fees (0.1%-9%). You are also free to use the delayed unstake to get your SOL back without any fee. However, you will have to wait 1-2 epochs [2-6 days] to get back your SOL and the accumulated rewards.").

84 "Before You Stake," *Tortuga Finance Docs*, available at https://docs.tortuga.finance/product-docs/stake-apt/before-you-stake ("Everyone who unstakes needs to wait until the end of the cycle for their APT to be unlocked from the validator.").

3. Other Remaining Coins and Tokens

56. Customer claims are also based on 421 other unique digital assets generally composed of coins and tokens.[85] Some of these assets are coins native to a blockchain and derive their value from use of the blockchain. For example, Solana (SOL) is the coin of the Solana blockchain and allows holders to validate transactions using Solana blockchain technology and vote on future upgrades.[86] As the Solana blockchain becomes more widely used, the ability to participate in the network provided by the coin also becomes more valuable. Other native coins in this category include Bitcoin (BTC) and Ether (ETH).[87]

57. Many of the other remaining digital assets are tokens associated with crypto projects or businesses that were created by a standardized smart contract on the Ethereum blockchain called "ERC-20," and were typically sold via ICO.[88] As I discussed in Section III.H.3, FTT is an ERC-20 token created by FTX with value closely tied to the success of FTX as an exchange.[89] As another example, INDIGG is an ERC-20 token intended for use on a gaming

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85 *See* Exhibit 6.

86 "What Is Solana (SOL)?" *coinbase.com*, available at https://www.coinbase.com/learn/crypto-basics/what-is-solana. Sasha Shilina, "What is Solana, and how does it work?" *Coin Telegraph*, March 6, 2022, available at https://cointelegraph.com/news/what-is-solana-and-how-does-it-work.

87 Helseth, Anders, "The difference between a native token and a token," *K33*, May 30, 2023, available at https://k33.com/research/articles/the-difference-between-a-native-token-and-a-token ("Tokens such as Bitcoin also serve as "general purpose medium of exchange and store of value").; Howell et al. (2020), at p. 3926.

88 *See* Howell et al. (2020), at p. 3943. While many token use ERC-20 standards, other types of token standards also exist on other blockchains. "What Are Token Standards? An Overview," *crypto.com*, February 2, 2022, available at https://crypto.com/university/what-are-token-standards.

89 "FTX Token FTT," *coinbase.com*, available at https://www.coinbase.com/price/ftx-token.

platform.[90] In general, these tokens become more valuable when their associated project or business experiences user growth.[91]

58. Figure 11 lists the five remaining coins and tokens in the Debtors' holdings that have the largest corresponding customer claims. The total face value of the customer claims associated with other remaining coins and tokens was $3.8 billion, of which $1.7 billion was accounted for by Bitcoin (BTC), and $930.6 million by Ether (ETH). I apply liquidation discounts to the prices of 71 of these 421 digital assets.

Figure 11
Top Five Other Coins and Tokens by Face Value of Customer Claims and Category Total

Ticker	Name	Face Value of Customer Claims ($MM)	Face Value of Debtors' Holdings ($MM)
BTC	Bitcoin	$1,687.83	$350.20
ETH	Ether	$930.57	$138.22
SOL	Solana	$128.74	$1,006.41
MAPS	Maps	$91.49	$992.96
XRP	Ripple	$91.49	$84.86
Other Digital Assets		$846.80	5,121.32
Total Across 421 Other Digital Assets		$3,776.92	$7,693.97

Notes and Sources:

[90] "Introducing IndiGG's token - $INDI," *IndiGG*, March 7, 2022, available at https://indigg.substack.com/p/introducing-indiggs-token-indi. "IndiGG", *Yield Guild Games*, available at https://www.yieldguild.io/guilds/indi-gg.

[91] Also included in this category are 9 prediction tokens. Prediction tokens are similar to futures contracts, allowing traders to take positions on a future event. However, I understand from FTX that unlike futures contracts with a frequently adjusted P&L statement, a customer needs to take an action to realize the payment associated with an prediction token. For example, the TRUMPWIN token allowed traders to take long positions (Trump wins the 2020 U.S. presidential general election) or short ones (Trump does not win). Prediction tokens expire to $1 if the event occurs and $0 otherwise. Given that all of these tokens had expired by the Petition Time, I assign a price to these tokens based on whether the at-issue event occurred and do not apply any discounts to that price. *See*, *e.g.*, Pirus, Benjamin, "Poloniex Adds US Election-Based Trades," *Coin Telegraph*, July 24, 2020, available at https://cointelegraph.com/news/poloniex-adds-us-election-based-trades ("[T]he election assets value $1 or $0, depending on the event's results. Holding 10 TRUMPWIN tokens value $10 USD if President Trump wins the November election. In contrast, holding 10 TRUMPLOSE tokens plunge to a value of $0 if the candidate wins.").

[1] Appendix C – Section C-I.B-C.
[2] Debtor holdings data are from the file "FTX - Debtors - Coin Report Excel 10.13.23_dist.xlsx." MSRM is categorized as a NFT in this file (see tab "Database Import," cell H2299). Figure 11 does not include assets categorized as NFTs, and so debtor holdings of MSRM are not included in this figure.

I. Non-Marketable Digital Assets

59. The final category of assets subject to customer claims are composed of non-marketable digital assets. I understand from FTX that these assets were subject to "vesting" or "unlocking" schedules, and that a customer would only be able to sell such assets after the assets vested or unlocked. In general, the rationale for lockup periods, both in the cryptoeconomy and among conventional firms (where employees are often awarded shares of stock or options with vesting schedules), is to align incentives between workers and the project. Vesting schedules incentivize workers to remain with the project in order to realize their ownership.[92]

60. There are three categories of non-marketable assets associated with customer claims: (1) LOCKED digital assets, which follow predefined vesting schedules applicable to all holders; (2) CUSTOM tokens, which follow vesting schedules specific to individual holders; and (3) non-marketable options on underlying tokens.[93]

61. Figure 12 provides an overview of the largest five groups of non-marketable assets by face value of customer claims based on the assets. Overall, non-marketable assets compose an unadjusted face value of $1.0 billion in customer claims. Most of the unadjusted face value of these customer claims comprises locked versions of SRM, MAPS, and OXY. I apply a discount to

[92] "Token Lockup," *CoinMarketCap Glossary*, available at https://coinmarketcap.com/academy/glossary/token-lockup ("Developers arrange smart contracts and deposit a particular quantity of tokens in a cold wallet, locking it for a specified length of time, say eight months. The **creators construct a public profile of the token lock-up for their community**. This instills confidence in the project and the team since it keeps them motivated to focus on long-term development rather than the market price of their coin. Additionally, it also boosts the confidence of the public supporting the project.") (Emphasis in original).

[93] *See* Section IV.B for further details on these categories.

account for the loss in value associated with non-marketability, discussed below in Section IV.B and in Appendix C. To the extent I find the underlying token to be subject to the asset liquidation discount, I apply that same discount to the non-marketable version of the asset, in addition to the discount for lack of marketability.

Figure 12
Top Five Groups of Non-Marketable Assets by Face Value of Customer Claims and Category Total

Underlying Asset Ticker	Non-Marketable Asset Name	Face Value of Customer Claims ($MM)	Face Value of Debtors' Holdings of Underlying Assets ($MM)
SRM	SRM_LOCKED, MSRM_LOCKED, SRM_IEF_LOCKED, SRM_CUSTOM, LOCKED_SRM_STRIKE-0.1_VEST-2030	$451.78	$3,703.74
MAPS	MAPS_LOCKED, MAPS_IEF_LOCKED, MAPS_CUSTOM, LOCKED_MAPS_STRIKE-0.07_VEST-2030	$305.64	$992.96
OXY	OXY_LOCKED, OXY_IEF_LOCKED, OXY_CUSTOM, LOCKED_OXY_STRIKE-0.03_VEST-2030	$160.25	$314.08
MEDIA	MEDIA_LOCKED	$32.24	$47.44
BOBA	BOBA_LOCKED	$23.80	$32.83
Other Non-Marketable Assets		$41.07	$1,710.72
Total Across 26 Non-Marketable Assets		$1,014.79	$6,801.78

Notes and Sources:
[1] Appendix C – Section C-I.B-C.
[2] Figure 12 treats options as if they were the same as the underlying assets.
[3] FTT_CUSTOM, FTT_LOCKED, and non-marketable FTT options are included in the FTX Equity Claims and FTT category. To avoid double-counting these tokens, I do not include them in this figure. However, I consider these tokens non-marketable and apply DLOM to them.

IV. ADJUSTMENTS TO THE PRICES OF A SUBSET OF DIGITAL ASSETS

62. In this section, I discuss the three adjustments I apply to a subset of the digital assets on which customer claims are based: (i) discounts for asset liquidation, (ii) discounts for lack of marketability (DLOM), and (iii) assessment of the fundamental value of FTX equity and FTT.[94]

A. Asset Liquidation Discount

63. A perfectly liquid asset can be bought or sold at the prevailing market price.[95] For example, because the market for Apple stock is highly liquid, it is possible to buy or sell a large quantity of Apple stock immediately without impacting the stock price. In contrast, an ownership stake in a private company is illiquid. If an investor wishes to sell a stake in such a company immediately, he may have to accept a much lower price than the most recent price from a single orderly transaction.[96] Asset liquidation discounts can be large. For example, Coval and Stafford (2007) document that forced sales by distressed mutual funds reduce equity returns by 15 percent on average.[97]

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[94] I also note that for 88 digital assets, the Petition Time prices I received from A&M are based on trades that occurred at least one month prior to the Petition Date. Four of these 88 digital assets are stablecoins or wrapped tokens that can be redeemed for fiat currency or the underlying coin. I adjust the prices of the remaining 84 digital assets to zero as the staleness of the prices of these assets indicate that there was likely no reliable market for these assets as of the Petition Time. The face value of the customer claims associated with these digital assets is $2.3 million.

[95] Brealey, Richard A., Stewart C. Myers and Franklin Allen, *Principles of Corporate Finance*, 13th ed., McGraw Hill Education, p. 758 ("Liquid assets can be converted into cash quickly and cheaply.").

[96] *See* Damodaran, Aswath, "Marketability and Value: Measuring the Illiquidity Discount," *Stern School of Business Working Paper*, 2005, pp. 1-60, at p. 3 ("When you buy a stock, bond, real asset or a business, you sometimes face buyer's remorse, where you want to reverse your decision and sell what you just bought. The cost of illiquidity is the cost of this remorse. In the case of publicly traded stock in a heavily traded company, this cost should be small. It will be larger for stock in a small, over-the-counter stock and will escalate for a private business, where there are relatively few potential buyers. … You can sell any asset, no matter how illiquid it is perceived to be, if you are willing to accept a lower price for it.").

[97] *See* Coval, Joshua and Erik Stafford, "Asset Fire Sales (and Purchases) in Equity Markets," *Journal of Financial Economics*, Vol. 86, No. 2, 2007, pp. 479-512, at p. 491 ("In Panel A, the pattern in average abnormal returns around the widespread selling of stocks held by distressed mutual funds is striking (see Fig. 2 for a graphical

64. An asset liquidation discount depends not only on the liquidity of the underlying market, but also on the size of the position that is being liquidated. Given the same level of market illiquidity, liquidating a larger position will generally entail a larger discount. First, if the size of the sale is large, it may be difficult to find a counterparty willing to purchase the total size of the position at the prevailing market price. Second, as soon as the market realizes there is a large position that is being liquidated, buyers may strategically purchase the position at lower prices.[98] Additionally, given the transparency of the blockchain, trades conducted on-chain will be observable to the market, which may affect sales and pricing.[99] Average daily volume in normal times is often used as a benchmark to gauge the size of the transaction the market can absorb.[100] If the position being liquidated is large relative to the typical daily trading volume, liquidation can be costly.

65. The Debtors held 408 out of 458 tokens and coins that have customer claims associated with them and that may be subject to an asset liquidation discount in my framework.[101] The Debtors' holdings of many of these coins and tokens were large relative to their trading volume

representation). We find significantly negative abnormal returns in the months of forced selling and the months immediately preceding."), p. 495 (Figure 2 shows that the cumulative return around the forced sales is -15 percent).

98 Brunnermeier, Markus K. and Lasse Heje Pedersen,"Predatory Trading," *Journal of Finance*, Vol. 60, No. 4, 2005, pp. 1825-1863, at p. 1825 ("The predatory trader would like to "front-run" the distressed trader by selling before him and buying back shares after the distressed trader has pushed down the price further.")

99 Liu, Jiageng, Igor Makarov, and Antoinette Schoar, "Anatomy of a Run: The Terra Luna Crash," *NBER Working Paper* , 2023, pp. 1-60, at p. 1 ("Cryptocurrencies and decentralized finance (DeFi) aspire to build a new financial architecture. Open access for all users and observability of pseudonymous transactions on the blockchain are among the central building blocks of this ecosystem.")

100 Kyle, Albert S. and Anna A. Obizhaeva, "Market Microstructure Invariance: Empirical Hypotheses," *Econometrica*, Vol. 84, No. 4, 2016, pp. 1345-1404.

101 These are tokens and coins potentially subject to an asset liquidation discount, including wrapped tokens, staked coins, non-marketable assets, FTT related tokens and other digital assets.

as of the Petition Time. Specifically, for 124 tokens the Debtors held more than the average daily trading volume of the asset.[102]

66. MAPS and OXY are extreme examples of a situation in which the underlying market could not realistically absorb the quantity of the Debtors' holdings. As of the Petition Time, the Debtors held 10.08 billion units of MAPS and 9.99 billion units of OXY while the average daily trading volumes of those tokens were 510 thousand and 1.73 million units, respectively.[103] If the Debtors were to sell five percent of the average daily volume of MAPS every day starting from the Petition Date, it would take 1,082 years to liquidate all the Debtors' holdings of MAPS, assuming those daily volumes were to persist and holding all else equal. The corresponding length of time for OXY is 316 years. Even with an assumption that the Debtors could have sold up to 100 percent of the average daily volume of MAPS and OXY every day, it would take 54 years and 16 years to liquidate their holdings of MAPS and OXY, respectively. These calculations suggest that the liquidated USD value of MAPS and OXY, even following a slow trading liquidation strategy, would likely be very small relative to the original holdings.[104]

67. Academic studies have modeled the discount from large sell orders based on the assumption that the asset is liquidated slowly to reduce liquidation costs.[105] Models based on this

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[102] *See* Appendix C for the description of the source of data and how I calculate average daily trading volume. The average daily trading volumes are calculated over the one-year period from November 2, 2021 to November 1, 2022.

[103] The average daily trading volumes are calculated over the one-year period from November 2, 2021 to November 1, 2022. *See also* Appendix C.

[104] *See* Appendix C for the description of the source of data and how I calculate average daily trading volume.

[105] The square-root cost function, which models trading costs as a function of the ratio of the amount to be sold to daily trading volume, is often adopted by academics and practitioners for slow-trading models. Gabaix et al. (2006) provide theoretical foundation of the square-root cost function under the slow-trading assumption. *See* Gabaix, Xavier, Parameswaran Gopikrishnan, Vasiliki Plerou, and H. Eugene Stanley, "Institutional Investors and Stock Market Volatility," *Quarterly Journal of Economics*, Vol. 121, No. 2, 2006, pp. 461-504 ("Gabaix et al. (2006)"). Empirically, trading costs as a function of trade size appear to follow a square-root form. Frazzini,

approach are actively applied by practitioners and academics to many different types of assets.[106] The slow trading assumption incorporated in these models parallels the assumption in my assignment that the Debtors' assets were to be sold in an orderly liquidation commencing at the Petition Time.

68. I estimate asset liquidation discounts using the Kyle and Obizhaeva (2016, hereafter "KO") model, which is a version of a slow trading model.[107] KO is published in *Econometrica,* which is one of the top five journals in Economics and is widely regarded as the most prominent journal for new methods in economics and finance. The KO model calculates the asset liquidation discount on an asset holding of a certain size. The asset liquidation discount contains two components: the price impact cost and the bid-ask spread cost.[108] The price impact cost represents the change in the asset's price in response to a given sized trade. The bid-ask spread cost is incurred when the bid price (the highest price a buyer will offer) and the ask price (the lowest price a seller will accept) of an asset are different. In a completed transaction, the buyer pays the ask price and

Andrea, Ronen Israel, and Tobias J. Moskowitz, "Trading Costs," *Working Paper*, 2018, pp. 1-47, at p. 3 ("A formal test of [the relationship between trade size and price changes] using our data reveals a power-law function with a coefficient close to ½"); Donier, Jonathan and Julius Bonart, "A Million Metaorder Analysis of Market Impact on the Bitcoin," *Market Microstructure and Liquidity*, Vol. 1, No. 2, 2015, pp. 1-29, at p. 1 ("[Using more than one million metaorders,] we empirically confirm the "square-root law" for market impact [for Bitcoin/USD exchange market.]"), p. 2 ("Previous studies … found that the average market impact of a metaorder … approximately follows the "square-root law"). *See*, *also*, Gabaix, Xavier, Parameswaran Gopikrishnan, Vasiliki Plerou, and H. Eugene Stanley, "A Theory of Power-Law Distributions in Financial Market Fluctuations," *Nature*, 2003, Vol. 423, pp. 267-270; Tóth, Bence, Yves Lempérière, Cyril Deremble, Joachim de Lataillade, Julien Kockelkoren, and Jean-Philippe Bouchaud, "Anomalous Price Impact and the Critical Nature of Liquidity in Financial Markets," *Physical Review X*, Vol. 1, No. 2, 2011, pp. 1-11; KO; Gatheral, Jim, "Three Models of Market Impact," *Market Microstructure and High-Frequency Data*, May 19, 2016.

[106] *See*, *e.g.,* Frazzini, Andrea, Ronen Israel, and Tobias J. Moskowitz, "Trading Costs," *Working Paper*, 2018, pp. 1-47; Gatheral, Jim, "Three Models of Market Impact," *Market Microstructure and High-Frequency Data*, May 19, 2016.

[107] Kyle, Albert S. and Anna A. Obizhaeva, "Market Microstructure Invariance: Empirical Hypotheses," *Econometrica*, Vol. 84, No. 4, 2016, pp. 1345-1404 ("KO").

[108] *See* Appendix C, Equation (2) for technical details.

the seller receives the bid price.[109] These two components of the KO measure depend on the execution price (the price of the asset at the time the trade happens), the average daily trading volume of the asset over a period of time, the volatility of the asset returns over a period of time, and the size of the trades. In practice, the price impact cost accounts for the vast majority of the asset liquidation discounts reported in Exhibit 3. Appendix C provides the technical details of the model and further explains the intuition behind the calculations.

69. I adopt the KO measure over other measures because it is based on rigorous economic theory and because in my view it is likely applicable to digital asset markets. Since the model is based on general principles, KO suggest that it is appropriate not only for public equities (on which the paper focuses), but also for a wide range of assets.[110] My opinion is that this should include cryptocurrencies. Certain features of cryptocurrency markets, such as small tick sizes, competitive market-makers, low transaction fees, and minimal taxes, imply that the KO model may in fact be more applicable to cryptocurrency markets than to some of the settings where KO posit that their method applies, such as for certain bond, commodity, or currency markets.[111]

70. In my calculation of asset liquidation discounts, I include information on trading volume across all exchanges for which I have obtained historical data, excluding three exchanges

[109] A limit order refers to the order that specifies price and quantity of the order. If the limit buy (sell) order is below (above) the highest bid price (ask price), the order is recorded in the limit order book and are called "non-marketable limit order." Holden, Craig W., Stacey Jacobsen, and Avanidhar Subrahmanyam, "The Empirical Analysis of Liquidity," *Foundations and Trends in Finance*, Vol. 8, No. 4, 2013, pp. 263-365, footnote 3.

[110] KO, at p. 1348 ("[W]e believe that [the assumptions and hypotheses in the model] generalize to markets for commodities, bonds, currencies, and aggregate indices such as exchange-traded funds and stock index futures contracts. We also believe that [the assumptions and hypotheses in the model] generalize to time series."), p. 1401 ("We conjecture that predictions of [the assumptions and hypothesis in the model] generalize to other markets such as bond markets, currency markets, and futures markets, as well as to other countries.").

[111] KO, at p. 1348 ("The predictions of [the model] may hold most closely when tick size is small, market makers are competitive, and transaction fees and taxes are minimal.").

which I understand from Coin Metrics to be unreliable.[112] This is a conservative assumption because there is evidence that trading volumes of digital assets are often inflated due to widespread "wash trading" on even well-established exchanges.[113] Wash trading refers to transactions made with no market risk or changes in the trader's market position, such as when an individual sells an asset to herself.[114] Wash trades create the appearance of higher volume, which can be helpful both for exchanges and for the owners or issuers of particular assets. Higher trading volume leads to lower estimated KO discounts.

71. After using the KO model to estimate asset liquidation discounts for digital assets in the Debtors' holdings that are also the basis for customer claims, I apply them to the market prices of the assets as of the Petition Time. I only apply a discount if the discount is more than 10 percent, based on an instruction from FTX. Figure 13 summarizes the asset liquidation discounts for the five digital assets in the Debtors' holdings that have the largest corresponding customer claims, excluding FTT. Exhibit 3 presents all the asset liquidation discount estimates that fall above the 10 percent threshold. In total, 71 unique assets in this category receive discounts. These 71 digital assets that receive discounts (and associated non-marketable assets) represent 56 percent of the face value of Debtors' holdings and 10 percent of the face value of customer claims.

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112 *See* Appendix C-I.D for details on how I measure trading volume.

113 For example, Cong et al. (2023) find that wash trading accounted for 70 percent of volume on top exchanges. *See* Cong, Lin William, Xi Li, Ke Tang, and Yang Yang, "Crypto Wash Trading," *Management Science*, Vol. 69, No. 11, 2023, pp. 6427-6454 ("Cong et al. (2023)"). Also see Victor, Friedhelm and Andrea Marie Weintraud, "Detecting and Quantifying Wash Trading on Decentralized Cryptocurrency Exchanges," *In Proceedings of the Web Conference*, 2021, ¶¶ 259-81; *SEC v. Binance Holdings Limited, et al.*, Complaint, Case No. 1:23-cv-01599, June 5, 2023, pp. 63-69; "CFTC Orders Coinbase Inc. To Pay $6.5 Million for False, Misleading, or Inaccurate Reporting and Wash Trading," *Commodity Futures Trading Commission*, March 19, 2021, available at https://www.cftc.gov/PressRoom/PressReleases/8369-21.

114 "Futures Glossary," *Commodity Futures Trading Commission*, available at https://www.cftc.gov/LearnAndProtect/AdvisoriesAndArticles/CFTCGlossary/index.htm#washtrading.

Figure 13
Top Five Digital Assets with Asset Liquidation Discount by Customer Claims, Excluding FTT

Underlying Asset Ticker	Face Value of Customer Claims ($MM)	Face Value of Debtors' Holdings of Underlying Assets ($MM)	Asset Liquidation Discount
SRM	$509.64	$3,703.74	58.3%
MAPS	$397.13	$992.96	100.0%
OXY	$208.88	$314.08	100.0%
MEDIA	$32.71	$47.44	53.2%
BOBA	$30.21	$32.83	25.0%

Notes and Sources:
[1] Appendix C. Exhibit 3.
[2] For the purpose of this Figure, the face value of customer claims represents the total face value for all claims where the underlying asset is the token noted in the first column of the Figure.

B. Discount for Lack of Marketability (DLOM)

72. Non-marketable assets cannot be sold for a period of time, usually for legal or contractual reasons. All else equal, non-marketable assets are less valuable than marketable assets.[115] The percentage difference between the value of otherwise identical marketable and non-marketable assets is known as the DLOM.

73. The DLOM reflects the opportunity cost of holding a non-marketable asset. An investor with immediate cash needs cannot readily monetize a non-marketable asset, whereas an

[115] *See, e.g.*, Chaffe, David B. H. III, "Option Pricing as a Proxy for Discount for Lack of Marketability in Private Company Valuations," *Business Valuation Review*, 1993, pp. 182-188 ("Chaffe (1993)"); Longstaff, Francis A., "How Much Can Marketability Affect Security Values?" *Journal of Finance*, Vol. 50, No. 5, 1995, pp. 1767-1774; Finnerty, John D., "An Average-Strike Put Option Model of the Marketability Discount," *Journal of Derivatives*, Vol. 19, No. 4, 2012, pp. 53-69 ("Finnerty (2012)"); Ghaidarov, Stillian, "Analysis and Critique of the Average Strike Put Option Marketability Discount Model," *Working Paper*, 2009, pp. 1-15 ("Ghaidarov (2009)"); Abudy, Menachem, Hadar Binsky, and Alon Raviv, "The Effect of Liquidity on Non-Marketable Securities," *Finance Research Letters*, Vol. 26, 2018, pp. 139-144 ("Abudy et al. (2018)") for detailed discussion of why non-marketable assets are less valuable than the marketable assets.

otherwise identical marketable asset would provide the same investor with readily available liquidity. Non-marketable assets raise challenges for investors. For example, they are not amenable to portfolio rebalancing, which is required in many investment strategies. As a second example, investors cannot easily sell a non-marketable asset as their price expectations change, which increases exposure to price crashes, and, conversely, prevents taking advantage of temporary price upswings.[116] This risk is particularly acute for highly volatile assets, such as the non-marketable digital assets on the Exchanges.

74. In general, the opportunity cost of holding a non-marketable asset, and hence the DLOM, increases with (i) the length of the non-marketability period; and (ii) the volatility of the underlying asset's value. The longer the non-marketability period, the more likely it is that the holder of the non-marketable asset encounters a scenario where they would otherwise prefer to sell. Similarly, increased asset value volatility makes it both more likely that the asset becomes worthless during the non-marketability period, or that the asset would temporarily appreciate in value but leave the investor unable to monetize her stake at the top of the market.

75. Researchers have primarily modeled the opportunity cost of non-marketability using methodologies based on option pricing. These approaches are based on the intuition that the value of a put option, which represents the right to sell an asset at a pre-determined price, can proxy for the value lost due to non-marketability.[117] Alternative approaches calculate upper bounds to the DLOM by assuming that, in the absence of the non-marketability constraint, investors would

[116] For example, suppose an investor owns a digital asset and expects the market to crash in the next year. The investor has an opportunity to sell the asset before impending the crash if the digital asset she owns is marketable. However, the person is exposed to the crash if the asset is restricted from sale for legal or contractual reasons for one year or longer.

[117] *See*, *e.g.*, Chaffe (1993).

always sell at the highest price within the non-marketability period.[118] These approaches lead to unreasonably large DLOMs for volatile assets, such as the digital assets associated with customer claims, so I do not consider them.

76. I instead estimate the DLOM for non-marketable digital assets claimed by the Exchanges' customers using an option pricing model based on Finnerty (2012) and Ghaidarov (2009).[119] This model does not presume that investors have perfect foresight or any particular ability to time the market, consistent with empirical research on investor behavior.[120] Specifically, Finnerty (2012) and Ghaidarov (2009) model the DLOM as the value of an Asian average-strike put option, which gives its holder the right to sell the underlying asset at the asset's average price during a given period.[121] The DLOM in their model is a function of the volatility of the underlying asset's value and the length of the non-marketability period, but does not depend on the quantity of the asset that could potentially be traded. The formulas for calculating DLOM in Finnerty (2012) and Ghaidarov (2009) are approximations of the model's solution. Because the error from the approximation increases with higher volatility of the underlying asset and a longer non-marketability period, these formulas may result in an imprecise approximation of DLOM in the

[118] Longstaff (1995), Abudy et al. (2018).

[119] Finnerty (2012) and Ghaidarov (2009) are based on the same assumptions. The difference between the two is the way they approximate the solution of the model.

[120] The academic literature shows that investors in general lack timing ability. *See, e.g.*, Munoz, Fernando and Ruth Vicente, "Hindsight Effect: What Are the Actual Cash Flow Timing Skills of Mutual Fund Investors?" *Journal of Empirical Finance*, 2018, Vol. 45, pp. 181-193, at p. 192 ("These results, together, indicate that investors make wrong decisions on the time to gain exposure to the market. These wrong timing decisions lead to slightly worsen the returns that they achieve."); Daniel, Kent, Mark Grinblatt, Sheridan Titman, and Russ Wermers "Measuring Mutual Fund Performance with Characteristics-Based Benchmarks," *Journal of Finance*, 1997, Vol. 52, No. 3, pp. 1035-1058, at p. 1056 ("We find no evidence that funds are successful style timers.").

[121] Sundaram, Rangarajan and Sanjiv Das, *Derivatives: Principles and Practice*, 2nd ed., McGraw Hill Education, 2016, p. 476.

context of highly volatile digital assets.[122] Therefore, I use a simulation-based methodology to estimate the DLOM for the relevant assets. Appendix C provides a detailed description of this methodology.

1. DLOM for LOCKED Digital Assets

77. For some tokens, initially only a small number of units from the total supply can be freely traded while the rest remain "locked" until they "vest" (*i.e.*, become marketable) over a predetermined, asset-specific schedule.[123] These "vesting schedules" are typically linear, with a certain fixed number of tokens vesting each day, week, month, or quarter. Non-marketable digital assets with such vesting schedules that are the basis of customer claims contain the suffix "_LOCKED" in their tickers. For example, in the case of SRM_LOCKED, a fixed number of tokens was to vest every day until August 11, 2027.[124] Unadjusted customer claims based on LOCKED digital assets totaled $931 million as of the Petition Time.

78. A subset of LOCKED digital assets is owned by investors in the Incentive Ecosystem Fund ("IEF").[125] Digital assets owned by the IEF have a different vesting schedule and contain "IEF" in their ticker names. For example, while the vesting schedule of MAPS_LOCKED

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[122] Annualized volatility of the underlying assets among "_LOCKED" and "_CUSTOM" tokens during the Estimation Period range from 60 percent for MEDIA_LOCKED to 260 percent for LUNA2_LOCKED.

[123] *See, e.g.,* "Oxygen: The Prime Brokerage Protocol," *Oxygen*, December 2020, available at https://www.oxygen.org/Oxygen.pdf; "Maps: Whitepaper," *Maps.me*, January 2021, available at https://maps me/token/MAPS.pdf.

[124] *See* Exhibit 4A.

[125] Thurman, Andrew, "Solana DeFi Major Serum's 'Incentive Ecosystem Foundation' Is Raising $100M," *Coindesk*, January 7, 2022, available at https://www.coindesk.com/business/2022/01/07/solana-defi-major-serums-incentive-ecosystem-foundation-is-raising-100m.

was to end as of December 15, 2027, the vesting schedule of MAPS_IEF_LOCKED was to end as of August 11, 2027.[126]

79. I compute a DLOM for LOCKED digital assets using their vesting schedule and the volatility of the underlying (unlocked) asset as inputs to the model.[127] As mentioned above, although the Debtors did not directly hold these assets, they did hold the underlying. Figure 14 shows the resulting DLOM for each LOCKED digital asset as well as the face values of the Debtors' holdings of the underlying asset and customer claims based on the non-marketable assets. A more detailed table, also including the asset liquidation discounts as applicable, is shown in Exhibit 4A. DLOM values range from 16.8 percent to 49.6 percent for digital assets whose vesting schedule post-dated the Petition Time.

[126] Exhibit 4A.

[127] *See* Appendix C for details on the assumptions and calculation.

Figure 14
Summary of DLOM for LOCKED Digital Assets

Underlying Asset Name	Asset Name	Vesting Period (Years)	DLOM	Face Value of Customer Claims ($USD MM)	Face Value of Debtors' Holdings of Underlying Assets ($USD MM)
ATLAS	ATLAS_IEF_LOCKED	4.75	32.7%	$0.58	$8.93
BOBA	BOBA_LOCKED	2.86	31.1%	$23.80	$32.83
FIDA	FIDA_IEF_LOCKED	4.75	47.7%	$0.29	$80.99
	FIDA_LOCKED	2.09	34.1%	$19.05	
LUNA2	LUNA2_LOCKED	2.06	49.6%	$13.27	$0.39
MAPS	MAPS_IEF_LOCKED	4.75	42.4%	$0.34	$992.96
	MAPS_LOCKED	5.10	43.3%	$303.75	
MEDIA	MEDIA_LOCKED	5.47	21.1%	$32.24	$47.44
OXY	OXY_IEF_LOCKED	4.75	40.2%	$0.05	$314.08
	OXY_LOCKED	4.10	37.8%	$158.00	
POLIS	POLIS_IEF_LOCKED	4.75	31.2%	$0.21	$5.59
RAY	RAY_IEF_LOCKED	4.75	29.8%	$0.16	$6.39
SOL	SOL_IEF_LOCKED	4.75	35.2%	$1.42	$1,006.41
SRM	MSRM_LOCKED	4.75	32.6%	$58.82	$3,703.74
	SRM_IEF_LOCKED	4.75	32.8%	$0.93	
	SRM_LOCKED	4.75	32.6%	$312.28	
USD	USD_IEF_LOCKED	4.75	16.8%	$6.09	$601.88
FTT	FTT_LOCKED [1]	-	0%	$0.02	$722.47
UBXT	UBXT_LOCKED [1]	-	0%	+$0.00	$0.15
PYTH	PYTH_IEF_LOCKED [2]	-	0%	$0.00	$0.00
	PYTH_LOCKED [2]	-	0%	$0.00	
Total Across 21 LOCKED Digital Assets				$931.31	$7,524.24

Notes and Sources:
[1] FTT and UBXT are presumed to be fully unlocked as of Petition Date. Therefore, no DLOM is applied to FTT_LOCKED and UBXT_LOCKED.
[2] PYTH is presumed to have a price of zero. Therefore, no DLOM is applied to PYTH_IEF_LOCKED and PYTH_LOCKED.
[3] Appendix C. Exhibit 4A.

2. DLOM for CUSTOM Tokens

80. Some customers of the Exchanges have claims based on tokens with the suffix "_CUSTOM." I understand from FTX that these custom tokens are non-marketable; however,

unlike "_LOCKED" digital assets, they have bespoke vesting schedules for each customer.[128] Therefore, I compute a DLOM for these tokens on a per customer, rather than a per token, basis, using the volatility of their underlying, non-custom assets and the individualized vesting schedules.[129]

81. Figure 15 presents results of the estimated DLOM for CUSTOM tokens, with the Debtors' holdings of the underlying and customer claims also reported. DLOM values range from 5.5 percent for FTT_CUSTOM claims of customers 151162 and 160222, to 37.7 percent for the OXY_CUSTOM claims of customer 289114. As above, a more detailed table is shown in Exhibit 4B.

[128] *See* Exhibit 4B for a summary of customer-level vesting schedules.

[129] *See* Appendix C for details on the assumptions and calculation.

Figure 15
Summary of DLOM for CUSTOM Tokens

Underlying Asset Name	Customer ID	Asset Name	Vesting Period (Years)	DLOM	Face Value of Customer Claims ($USD MM)	Face Value of Debtors' Holdings of Underlying Assets ($USD MM)
SRM	289114	SRM_CUSTOM	4.72	32.5%	$68.34	$3,703.74
	368185	SRM_CUSTOM	2.92	26.2%	$0.11	
	374171	SRM_CUSTOM	4.76	32.7%	$0.37	
	408404	SRM_CUSTOM	5.81	35.6%	$0.54	
	410499	SRM_CUSTOM	5.81	35.6%	$0.54	
	2588067	SRM_CUSTOM	6.37	37.0%	$1.35	
	2791093	SRM_CUSTOM	4.76	32.7%	$0.42	
	3064436	SRM_CUSTOM	2.92	26.2%	$0.11	
FTT	151162	FTT_CUSTOM	0.22	5.5%	+$0.00	$722.47
	160222	FTT_CUSTOM	0.22	5.5%	+$0.00	
	175907	FTT_CUSTOM	1.97	15.9%	$0.43	
	205992	FTT_CUSTOM	1.97	15.9%	$0.63	
	713123	FTT_CUSTOM	1.97	15.9%	$1.36	
	1743405	FTT_CUSTOM	2.28	17.1%	$0.01	
	1785423	FTT_CUSTOM	5.16	25.2%	$6.91	
OXY	266388	OXY_CUSTOM	1.35	23.1%	$0.07	$314.08
	289114	OXY_CUSTOM	4.08	37.7%	$1.71	
MAPS	266388	MAPS_CUSTOM	1.22	23.4%	$0.32	$992.96
Total Across 4 CUSTOM Tokens					$83.22	$5,733.26

Notes and Sources:
[1] Appendix C. Exhibit 4B.

3. DLOM for Non-Marketable Options

82. I understand from FTX that there are certain digital assets besides the LOCKED and CUSTOM digital assets discussed above that are also subject to a non-marketability period. I further understand that these assets were options that gave the holder of the option the right but not the obligation to purchase the underlying asset at a prespecified price. For simplicity I proxy the value of the option by the value of the underlying asset.[130]

[130] The value of the underlying asset is generally higher than the value of the option. Hull, John C., *Options, Futures, and Other Derivatives,* 5th ed., Prentice Hall, 2002, p. 171 ("An American or European call option gives the holder the right to buy one share of a stock for a certain price. No matter what happens, the option can never be worth more than the stock. Hence, the stock price is an upper bound to the option price").

83. Based on my understanding from FTX, for each option different customers had different vesting schedules, which generally fell into two categories. First, for certain customers the options were to vest in a single installment on January 1, 2024 ("Option Schedule 1"). Second, for certain other customers, the options were to vest over a five-year annual vesting schedule beginning in January 1, 2022 and ending January 1, 2026 ("Option Schedule 2").

84. I compute the DLOM for each option for each of these two vesting schedules using the volatility of the underlying assets. Figure 16 presents the estimated DLOM for each option and each vesting schedule, alongside the face value of customer claims and Debtors' holdings of the underlying. DLOMs range from 15.7 percent (Option Schedule 2 for FTT) to 33.1 percent (Option Schedule 1 for MAPS). A more detailed table is reported in Exhibit 4C.

Figure 16
Summary of DLOM for Non-Marketable Options

Underlying Asset Name	Asset Name	DLOM	Face Value of Customer Claims ($USD MM)	Face Value of Debtors' Holdings of Underlying Assets ($USD MM)
SRM	LOCKED_SRM_STRIKE-0.1_VEST-2030-1	24.9%	$7.96	$3,703.74
	LOCKED_SRM_STRIKE-0.1_VEST-2030-2	21.3%		
MAPS	LOCKED_MAPS_STRIKE-0.07_VEST-2030-1	33.1%	$1.23	$992.96
	LOCKED_MAPS_STRIKE-0.07_VEST-2030-2	27.9%		
FTT	FTT_STRIKE-0.4_UNLOCK-EXPIRE-2030-1	18.2%	$0.44	$722.47
	FTT_STRIKE-0.4_UNLOCK-EXPIRE-2030-2	15.7%		
	FTT_STRIKE-0.4_EXERCISE-2030-1	18.2%	$0.12	
	FTT_STRIKE-0.4_EXERCISE-2030-2	15.7%		
OXY	LOCKED_OXY_STRIKE-0.03_VEST-2030-1	31.1%	$0.42	$314.08
	LOCKED_OXY_STRIKE-0.03_VEST-2030-2	26.4%		
Total Across 5 Non-Marketable Options			$10.18	$5,733.26

Notes and Sources:
[1] For each option, Suffix "-1" corresponds to Option Schedule 1; suffix "-2" corresponds to Option Schedule 2.
[2] Appendix C. Exhibit 4C.

C. Accounting for the Commencement of These Chapter 11 Cases in Valuing FTX Equity Claims and FTT

85. Equity holders in a corporation are the "residual claimants" of the cash flows generated by the corporation.[131] They are at the bottom of the repayment hierarchy in a bankruptcy proceeding, below all customers and other creditors. I understand from Counsel that equity holders are not expected to be compensated pursuant to the plan of reorganization in these Chapter 11 Cases, as of this writing.[132] Under those assumptions, it is my opinion that FTX equity claims have zero fundamental value.

86. As I discussed in Section III.G, the value of FTT (beyond that which was purely speculative) derived from (i) a claim on FTX revenues through FTX's regular repurchase of FTT tokens using the trading fees; and (ii) trading discounts and other benefits on the Exchanges. Without functioning Exchanges, both sources of value are absent. I understand from Counsel that any sale of the Exchanges' assets would not involve a role for FTT following the effective date of a confirmed plan of reorganization. Under those assumptions, there is neither a current nor future source of value for FTT, and therefore it is my opinion that FTT has zero fundamental value.

87. I show in Exhibit 5 the impacted FTX equity and FTT claims. I also show in this exhibit the asset liquidation discount on FTT, as well as the DLOM on non-marketable FTT claims, to offer a consistent approach to all the tokens. The asset liquidation discount is relatively low, at about 23 percent, because the daily volatility of FTT was low during the estimation period;

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131 Moles, Peter and Nicholas Tery, *The Handbook of International Financial Terms*, Oxford University Press, 1997 (Residual claim refers to "rights of shareholders to the remaining assets once the fixed claims on a business have been met."); Berk, Jonathan and Peter DeMarzo, *Corporate Finance*, 5th ed., Pearson Education, 2020 ("Berk and DeMarzo (2020)"), p. 526 ("Promised payments to debt holders must be made *before* any payments to equity holders are distributed.").

132 Baird, Douglas G. and Robert K. Rasmussen, "Chapter 11 at Twilight," *Stanford Law Review*, 2003, pp. 673-699, at p. 692 ("[E]ven when we do not have asset sales in large Chapter 11 cases, equity holders typically get wiped out.").

remarkably, it was even lower than the largest cryptocurrencies.[133] The volatility of FTT jumped dramatically after the Petition Date. In any event, the price history of FTT prior to the Petition Date was likely distorted due to the concealed fraud at FTX during that period.

D. Summary of Prices

88. Consistent with my assignment to apply any discounts that may result from the above steps to the complete list of digital assets on which creditor claims are based, in Exhibit 6 I provide a comprehensive list of prices for all digital assets on which I understand creditor claims are based. The prices in Exhibit 6 incorporate all adjustments discussed in this section as applicable. There are no adjustments to the prices of fiat currency, stablecoins, futures, leveraged tokens, tokenized stocks, and Spot+ derivatives. Discounts are applied to a limited subset of tokens and FTX equity claims as detailed in Exhibits 3-5.

Dated: December 27, 2023

Sabrina T. Howell

[133] The daily volatility of FTT was only 3.9 percent during the estimation period (November 2, 2021 – November 1, 2022), compared to volatilities of 3.4 percent for BTC and 4.4 percent for ETH.

Appendix A

SABRINA T. HOWELL

Associate Professor
Stern School of Business Finance Department
New York University

Website: www.sabrina-howell.com
Email: sabrina.howell@nyu.edu
Phone: (212) 998-0719

ACADEMIC POSITIONS & AFFILIATIONS

Associate Professor, NYU Stern (with tenure) (2022-)
Assistant Professor, NYU Stern (2015-2022)

Research Associate, NBER (2022-)
ABFER Fellow (2022-)
Faculty Research Fellow, NBER (2017-2022)
IPC PERC Research Fellow (2021-)

Associate Editor, *Review of Financial Studies* (2022-25)
Associate Editor, *Review of Corporate Finance Studies* (2022-25)
Associate Editor, *Management Science* (2020-22)

EDUCATION

PhD, Harvard University, 2015
Economics Track, Political Economy & Government Program
Advisors: Professors Josh Lerner (Chair), David S. Scharfstein, Raj Chetty, and Joseph E. Aldy

BA, Yale University, 2008
Majors: Economics, East Asian Studies
Summa cum laude, Phi Beta Kappa Junior Year (top 1% of class)

RESEARCH INTERESTS

Entrepreneurial finance, Innovation, Private Equity, Fintech, Energy, China

PEER-REVIEWED PUBLICATIONS

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TEACHING

2017-23	Applications in Entrepreneurial Finance: Fintech, NYU Stern (new course) 2023 Poets & Quants Best 40-Under-40 MBA Professor
2016	Topics in Entrepreneurial Finance, NYU Stern (created all course materials)
2013	Energy Industry Economics & Policy Sophomore Tutorial, Harvard University Economics Department (created course, solo teaching)
2012-13	Energy Policy Analysis, Harvard Kennedy School – doctoral-level course of the Harvard Graduate Consortium on Energy and the Environment (teaching fellow for Professor Joseph E. Aldy)
2008	Sustainability Economics, Hong Kong University and Zhejiang University. Harvard Graduate School of Education Crimson Fellow

NON-ACADEMIC EMPLOYMENT

2021-	U.S. Census Bureau Schedule A Employee
2019-	U.S. Air Force, Special Government Employee
2013-14	U.S. Department of Energy, Intern in the Office of Strategic Programs in the Office of Energy Efficiency and Renewable Energy
2012	Georgetown Economics Department, Research Assistant to Arik Levinson
2011	Harvard Center for the Environment, Research Assistant to Joseph E. Aldy
2011	National Economic Council, White House Intern for Nathaniel Keohane, the Special Assistant to the President for Energy and the Environment
2009-10	Securing America's Future Energy (SAFE), Senior Policy Analyst
2008-09	Charles River Associates, Analyst
2007	Hess Corporation, Summer Analyst
2005-06	Yale University Economics Department, Research Assistant to George Hall

HONORS, GRANTS, AND FELLOWSHIPS

2023	Poets & Quants Best 40-Under-40 MBA Professor
2022	Alfred P. Sloan Foundation Grant ($50,000) Omidyar Network Grant ($94,000)
2021	Appointed as Private Equity Research Consortium Research Fellow NYU Stern Yuki Arai Faculty Award for Best Paper in Finance ($10,000)
2020	*Review of Financial Studies* Referee of the Year ($1,000) AQR Asset Management Institute Young Researcher Award (£10,000) *Review of Finance* Distinguished Referee Kauffman Foundation Research Grant ($100,000)

2019	NBER Science of Science Funding Grant ($6,000)
2018	Private Equity Research Consortium Small Grant Program ($10,000) Stern Center for Global Economy and Business Research Grant ($6,000)
2017	Kauffman Foundation Junior Faculty Research Fellowship ($35,000) Kauffman Foundation Research Grant ($150,000)
2015	Kauffman Foundation Research Grant ($24,500) Stern Center for Global Economy and Business Research Grant ($7,000) Top Finance Graduate Award 2015 (Copenhagen Business School-AQR)
2014	Kauffman Best Student Paper Award Session, Roundtable for Engineering Entrepreneurship Research (REER)
2010-13	National Science Foundation Graduate Research Fellow
2013	Derek Bok Center for Teaching and Learning Certificate of Distinction in Teaching (reflects very high student ratings)
2011	Mossavar-Rahmani Center for Business and Government Summer Fellowship
2011-15	Harvard Environmental Economics Program Pre-Doctoral Fellow
2008	Emerson Tuttle Cup Winner (most distinguished student in Yale's Davenport College)

SERVICE

Member of the Advisory Board to the American Female Finance Committee of the American Finance Association (2019-2022), and am currently the AFFECT liaison for my department.

Member of the 2019-20 American Finance Association Nominating Committee, chaired by President Kenneth Singleton.

Current or previous Associate Editor at *The Review of Financial Studies*, *Review of Corporate Finance Studies*, and *Management Science*.

Founded and co-organize the Women Assistant Professors of Finance Conference at NYU Stern (WAPFIN@Stern), which has been held every Fall since 2015.

Co-organized the NBER Productivity, Innovation and Entrepreneurship meetings every year from 2018 to 2024.

Co-organized the virtual Junior Entrepreneurial Finance/Innovation Lunch 2020-21.

Serve on numerous program committees and as track chair (some for multiple years in a row) for conferences including the AFA, WFA, SFS Cavalcade, FIRS, EFA, MFA, and the Washington University Annual Conference on Corporate Finance.

PERSONAL INFORMATION

I am married with two children, born October 2018 and June 2023. I am a U.S. citizen.

Appendix B

Documents Considered List

Legal Documents

Commodity Futures Trading Commission v. Samuel Bankman-Fried et al. , Amended Complaint, Case No. 1:22-cv-10503-PKC, December 21, 2022.

Declaration of John J. Ray III In Support of Chapter 11 Petitions and First Day Pleadings, November 17, 2022.

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FTX Trading Ltd., et al., Debtors. , Motion for Joint Administration Filed by FTX Trading Ltd., Case No. 22-11068-JTD, November 14, 2022.

FTX Trading Ltd., et al., Debtors. , Official Form 201 Voluntary Petition for Non-Individuals Filing for Bankruptcy, Case No. 22-11068-JTD, November 11, 2022.

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Appendix C

Detailed Description of Methodology for Estimating Asset Liquidation Discount and Discount for Lack of Marketability

1. This appendix provides details on the methodology I use to calculate asset liquidation discounts and discounts for lack of marketability ("DLOM") presented in Section IV of my report (the "Report"). This appendix is organized as follows. In Section C-I, I discuss the details of the datasets on which I rely and the steps I take to process them. In Section C-II, I discuss the details of the categorization of digital assets. In Section C-III, I discuss the details of the calculation of inputs for asset liquidation discounts and DLOM estimation. In Section C-IV, I discuss the details of the calculation of asset liquidation discounts for certain coins and tokens. In Section C-V, I discuss the details of the calculation of DLOM for non-marketable digital assets.

C-I. DATA DESCRIPTION

A. Petition Time Prices

2. I received from A&M a dataset containing Petition Time prices (the "Master Pricing Dataset").[1] I understand from A&M that prices of coins and tokens, including stablecoins, wrapped tokens, and staked coins, in this dataset are sourced from Coin Metrics and, only if Coin Metrics was unable to price the coin or token, the last trade price from the order books for the Exchanges ("Exchange Order Book"). Because tokenized stocks, leveraged tokens and futures were derivatives specific to FTX, prices for tokenized stocks and futures are sourced from Exchange Order Book, and prices of leveraged tokens are sourced from the ETF snapshot table in the FTX environment which I understand was constructed by FTX to capture the market

[1] The file name of this dataset is "Pricing Master 12.19.23 vShared (with EU) (Clean).xlsx."

price of the underlying contracts for each leveraged token every 15 seconds. Fiat currency exchange rates are sourced from the Wall Street Journal's Markets Historical Open Prices data. I set the Petition Time prices for Spot+ derivatives to the Petition Time price of the underlying digital asset.

3. I set the Petition Time prices for LOCKED and CUSTOM digital assets equal to the Petition Time Price of their underlying digital assets. I set the Petition Time prices of MSRM and MSRM_LOCKED equal to one million times the Petition Time Price of SRM, as MSRM represents a bundle of one million SRM tokens. Similarly, I set the Petition Time prices of KBTT, KSOS, KSHIB, and KLUNC equal to one thousand times the Petition Time prices of BTT, SOS, SHIB, and LUNC, respectively. I set the Petition Time prices of all tokens related to PYTH, which include PYTH, PYTH_LOCKED and PYTH_IEF_LOCKED, to zero as instructed by Counsel.[2]

B. Debtors' Holdings

4. When referring to the Debtors' holdings in the Report, I understand that the dataset on the Debtors' digital asset holdings that I received from A&M includes information on the digital assets of the Debtors as of the Petition Time (the "Coin Report Dataset").[3] Specifically, the data include the number of units of each asset held by the Debtors.[4] A&M also

[2] I understand that the Petition Time price of PYTH is assumed to be zero because the original PYTH token was reminted and superseded by tokens now held by the Debtors.

[3] I understand from A&M that quantities reflect the Debtors assets that have been located as of October 13, 2023.

[4] The file name of the data is "FTX - Debtors - Coin Report Excel 10.13.23_dist (Clean).xlsx." Holdings quantity is from column G. I exclude digital assets with "Wallet Group" equal to "Japan" and digital assets with "Coin Mapping" equal to "NFT" based on direction from Counsel. I also exclude digital assets with "Summary Group" equal to "Hacked" or "Token Vesting."

provided information on the Debtors' cash balances as of the Petition Time.[5] I use the data on the Debtors' holdings as an input to the Kyle and Obizhaeva (2016, hereafter "KO") model,[6] discussed in Section C-IV below.

5. For the purpose of calculating asset liquidation discounts, I sum the quantity of the Debtors' holdings of any wrapped tokens or staked coins with their holdings of the underlying coin, consistent with the discussion presented in Sections III.H.1 and III.H.2 that in an orderly liquidation, wrapped tokens and staked coins would be unwrapped and unstaked, respectively, and liquidated alongside the underlying coins.[7]

6. For each digital asset, I multiply the number of units held by the Debtors with Petition Time price to obtain the USD equivalent face value of Debtors' holdings.

C. Customer Claims

7. I understand that the Master Pricing Dataset contains the number of units of each digital asset included in the amended Schedule F of Assets and Liabilities that the Debtors filed for the Exchanges in June 2023 [D.I. 1720-1766], as well as additional digital assets that the Debtors have identified may be the basis for customer claims, in each case excluding NFTs and as of the Petition Time. When using the term "customer claims" in my report, I refer to the claims listed in the Master Pricing Dataset. For each asset, I multiply the number of units on

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5 The file name of the data is "FTX -- Petition Date Balance by LCY.xlsx."

6 Kyle, Albert S. and Anna A. Obizhaeva, "Market Microstructure Invariance: Empirical Hypotheses," *Econometrica*, Vol. 84, No. 4, 2016, pp. 1345-1404 ("KO").

7 I also sum the quantity of Debtors' holdings, if any, of MSRM, KBTT, KSOS, KLUNC, and KSHIB with their respective underlying assets. Before summing, I temporarily multiply these five tokens' quantities by one million (for MSRM) or one thousand (for the latter four tokens).

which customer claims are based on by the unadjusted Petition Time price to obtain the USD equivalent face value of customer claims.

8. In addition to the Master Pricing Dataset, I rely on customer-level claims data to identify holders of CUSTOM tokens and compute DLOM for these tokens, which have individualized vesting schedules.[8]

D. Historical Data on Digital Asset Prices and Trading Volume

9. I received a dataset on historical price and trading data from Coin Metrics,[9] on which I primarily rely to compute inputs for the asset liquidation discount model, including daily returns, volatility of returns, and average daily trading volume.

10. These data include historical daily price and trading volume for digital assets between January 1, 2019 and October 3, 2023. For each combination of digital asset, date, exchange, and quote currency (the unit in which the price of the digital asset is quoted on the exchange) in this universe, the dataset includes information on the following: volume-weighted average price ("VWAP", in quote currency), close price (in quote currency), trading volume (in units of the digital asset), and trading volume (in USD).[10]

11. I first restrict the dataset to coins and tokens.[11] This excludes, for example, futures contracts. Next, I convert price data to USD by deriving a conversion rate from dividing trading

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[8] The file name of the data is "balances_valuations_092823 (Clean).csv." Upon instructions from Counsel, I filter the data to only include scheduled claims and customer entitlements by setting 'Scheduled?' = 'Y' and 'Related Party vs. Customer Flag' = 'customer entitlement.'

[9] The file name of the data is "CoinMetrics - Spot & Future - Day - 20190101 to 20231003.txt."

[10] The data also includes the following variables not used in the analysis: open price, high price, low price, number of trades.

[11] The original historical dataset includes three 'Trade_Type' column values: 'spot,' 'future,' and 'nan.' I filter the dataset to only include data where 'Trade_Type' = 'spot.'

volume in USD by trading volume in units of the base digital asset and apply this conversion to VWAP and close price. I eliminate all trading data from three exchanges which I understand Coin Metrics considers unreliable.[12] For some assets, Coin Metrics identifies particular "trusted exchanges."[13] In these cases, I use price data from only these "trusted exchanges" for variables calculated in Section C-III, while retaining all trading volume data.[14] Finally, I was informed by A&M that merging asset tickers from customer-level claims data to Coin Metrics data incorrectly matches four assets, so I do not rely on Coin Metrics historical data for those four assets.[15]

12. Next, I aggregate historical price data by token and date using trading volume in USD as a weight to aggregate prices across exchanges and quote currencies. This yields a dataset of daily prices for each digital asset in the sample.

13. For coins and tokens for which Coin Metrics did not provide me with data, I obtain daily historical price and trading volume data from CoinMarketCap via their API.[16] For

[12] I exclude the following three exchanges: LBank, ZB.com, LocalBitcoins.

[13] This information is included in "ftx-selected-markets.csv" and "ftx-selected-markets-second-tranche.csv." I understand these exchange and quote currency combinations for each digital asset to represent trustworthy pricing data as determined by Coin Metrics.

[14] I apply trusted exchange filter only to the prices of digital assets for which Coin Metrics provides a list of trustworthy markets. Data on all digital assets exclude price and trading volume data from the three unreliable exchanges. This approach would result in lower estimates of asset liquidation discounts compared to using volumes from only trusted exchanges.

[15] The four digital assets are BIFI, IXT, TON, and WOM. I use historical data from CoinMarketCap for them.

[16] "CoinMarketCap API Documentation," *CoinMarketCap*, available at https://coinmarketcap.com/api/documentation/v1/#operation/getV2CryptocurrencyQuotesHistorical. I pull data using the endpoint named "Historical quotes."

coins and tokens without Coin Metrics data or CoinMarketCap data,[17] I obtain daily historical price and trading volume data from Live Coin Watch using their API.[18]

E. Vesting Schedules

14. I also received a dataset from A&M which I understand contains information on vesting schedules for LOCKED and CUSTOM tokens, including the frequency at which they vest ("Vesting Frequency"), and the start and end dates of their vesting periods ("Vesting Start Date" and "Vesting End Date").[19] Additionally, for CUSTOM digital assets, the dataset also contains Customer IDs that match with those in the customer-level claims data. I use the vesting schedule data to compute inputs for my DLOM estimation model.

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[17] Such digital assets include NUC, MYC, and ILK.

[18] "Live Coin Watch API Documentation," *Live Coin Watch*, available at https://livecoinwatch.github.io/lcw-api-docs/#coinssinglehistory. I use the endpoint named "Coin Single History."

[19] The file name of the data is "CUSTOM Token Data - Account Identifiers 11.11.23 (Clean).xlsx" Vesting schedules for LOCKED digital assets are contained in the tab "Unlock Schedules" while schedules for CUSTOM tokens are contained in the tab "Account Identifiers."

To fill in missing data relating to vesting schedules, I make the following assumptions: (i) MSRM_LOCKED is equivalent to 1 million of SRM_LOCKED, and therefore inherits the same vesting schedule; (ii) LUNA2_LOCKED has vesting schedules specific to individual customers as a function of their holdings, and so I use the modal vesting period of 2 years from December 2022, which accounts for at least half of all locked LUNA; (iii) USD_IEF_LOCKED is assumed to have the same vesting schedule as the other IEF digital assets in the data, and in addition, assumes a price of $1 and a volatility of 0%; (iv) POLIS_IEF_LOCKED is assumed to have the same vesting schedule as the other IEF digital assets in the data; (v) FTT is presumed to be fully unlocked as of May 1, 2022, and therefore does not have a vesting period; (vi) UBXT is presumed to be fully unlocked as of August 2, 2021; (vii) No assumptions are made for PYTH_LOCKED and PYTH_IEF_LOCKED since I understand they are assumed to have a price of zero; (vii) For CUSTOM token-customer pairs with missing schedules or frequencies, I assume the vesting period length to be equal to the average of the vesting periods of pairs with the same token, and their vesting frequencies to be consistent with pairs with the same token. "LUNA 2.0 listing and Terra airdrop distribution schedule," *Cryptohopper*, May 30, 2022, available at https://www.cryptohopper.com/news/luna-2-0-listing-and-terra-airdrop-distribution-schedule-6635; "FTT Unlock Schedules," *FTX.com* (via Wayback Machine), available at https://web.archive.org/web/20221127141057/https://help.ftx.com/hc/en-us/articles/360031160031-FTT-Unlock-Schedules; "3 profitable things you can do with UBXT TODAY!" *UpBots* (via *Medium*), August 6, 2021, available at https://medium.com/upbotscom/3-profitable-things-you-can-do-with-ubxt-today-fccb84e609df ("As of August 2, 2021, our UBXT staking program on FTX has come to a close. If you had staked or locked UBXT your funds should now be unlocked.").

F. Risk-free Rates

15. I employ the daily U.S. Treasury yields as the risk-free rates used as inputs to my DLOM estimation model.[20] Because DLOM estimation requires risk-free rates corresponding to different time horizons, I collect Treasury yields corresponding to different time-to-maturities.

C-II. CATEGORIZATION OF DIGITAL ASSETS

16. The Master Pricing Dataset classifies digital assets into the following categories: (i) fiat currency, (ii) futures, (iii) leveraged tokens, (iv) tokenized stocks, (v) equity and equity-like claims in FTX, (vi) prediction tokens, (vii) non-marketable digital assets, and (viii) the remaining cyptocurrencies and tokens.[21] I further categorize Spot+ derivatives positions as the EU customer positions in coins and tokens in the Master Pricing Dataset. In addition to the data discussed above, I also rely on data from CoinMarketCap[22] to identify stablecoins and wrapped tokens and conduct additional research to identify staked coins which are not classified in any of the data above.[23]

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[20] "Daily Treasury Par Yield Curve Rates (2022)," *U.S. Department of the Treasury*, available at https://home.treasury.gov/resource-center/data-chart-center/interest-rates/TextView?type=daily_treasury_yield_curve&field_tdr_date_value=2022.

[21] Master Pricing Dataset includes to these asset categories using the following terms listed in the column "Type": (i) Fiat, (ii) Derivatives, (iii) Leveraged, (iv) Tokenized Stock, (v) FTX Equity, (vi) Prediction Token, (vii) Spot – Locked, (viii) Spot – Not Locked.

[22] These data are contained in CoinMarketCap Categories, available at coinmarketcap_api_categories.xlsx.

[23] I categorize a digital asset as stablecoin if column "is_stable_coin" from CoinMarketCap is flagged with an "X". I categorize a digital asset as wrapped token if the column "is_wrapped" from CoinMarketCap is flagged with an "X."

C-III. CALCULATION OF MODEL INPUTS

17. This section describes the calculation of daily returns, volatility, and average daily trading volume representing the inputs to the asset liquidation discount and DLOM models used in my analyses.

A. Estimation Period

18. I estimate inputs to the asset liquidation and DLOM models using data between November 2, 2021 and November 1, 2022 ("Estimation Period"). The Estimation Period is one year prior to the CoinDesk article which discussed the composition of Alameda's balance sheet.[24] I exclude the period from November 2, 2022 through the Petition Date from the Estimation Period to limit the effect of these Chapter 11 Cases on the model inputs. A longer Estimation Period generally reduces estimation errors.[25]

B. Daily Returns

19. I calculate daily returns as the percentage difference in close prices between adjacent days during the Estimation Period.[26] When I do not observe close prices on adjacent days, I set the returns on the latter day to be missing.

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[24] Allison, Ian, "Divisions in Sam Bankman-Fried's Crypto Empire Blur on His Trading Titan Alameda's Balance Sheet," *CoinDesk*, November 2, 2022, available at https://www.coindesk.com/business/2022/11/02/divisions-in-sam-bankman-frieds-crypto-empire-blur-on-his-trading-titan-alamedas-balance-sheet.

[25] I adjust the Estimation Period for certain assets. When calculating the discount for LUNA and LUNA2, I limit the estimation period from May 29, 2022 to November 1, 2022 after observing extreme price volatility in May 2022 that was caused by the crash of the Terra blockchain. Since this crash resulted in the creation of a new Terra blockchain on May 27, 2022, I begin my estimation period after the new token versions, and their prices, were established. *See* "Terra LUNA," *CoinMarketCap*, available at https://coinmarketcap.com/currencies/terra-luna-v2.

[26] *See* Section C-I.D for details on how I calculate historical daily prices.

C. Volatility

20. I calculate daily volatility as the standard deviation of daily returns for each digital asset in the data during the Estimation Period.[27] This metric is used in computing the asset liquidation discounts.

21. I annualize the daily volatilities for each digital asset.[28] This annualized metric is used in computing the Discount for Lack of Marketability ("DLOM").

D. Average Daily Trading Volume

22. I calculate the average daily trading volume as the average of the trading volume (quantity) for each digital asset that is traded daily in the market during the Estimation Period.[29] Average daily trading volume is used in computing the asset liquidation discounts.

C-IV. ESTIMATION OF ASSET LIQUIDATION DISCOUNT

23. I use the KO model, which is designed for slow trading strategies and requires only low frequency information.[30] I first provide theoretical justification of why the model is appropriate for a wide range of assets, including digital assets. After that, I explain the asset liquidation discount model from the KO paper and then describe how I use the model to estimate the asset liquidation discount for each digital asset.

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[27] As discussed in C-III.A, I use one year estimation period rather than an alternative period such as one month because digital asset markets are generally volatile, potentially resulting to incorrect estimates over short estimation windows. Using shorter time period may also prevent me from being able to estimate inputs for a large group of digital assets.

[28] I perform this calculation by multiplying the daily volatilities by $\sqrt{365}$.

[29] As I explain in ¶ 11, I drop trading volume data from three exchanges I understand to be unreliable and calculate the average using only available data over the Estimation Period.

[30] *See* KO.

A. Theoretical Underpinnings

24. The KO paper proposes and tests hypotheses about "market microstructure invariance" relationships, or constants, which can apply across assets when calculating the two primary costs of trading: the price impact and the bid-ask spread. The key idea is that although the price impact and the bid-ask spreads vary across assets and time, they have invariance properties when measured in "business time," which is the market velocity of the asset, or the rate at which trading activities happen. The "market microstructure invariance" hypotheses imply that although the microstructure characteristics of the digital asset market may differ from, for example, the stock or bond markets, they are similar when viewed from the perspective of market velocity. This assumption allows me to apply the KO model to calculate the asset liquidation discounts for digital assets.

25. The theory behind the KO model employs two central transformations. The first is to model transactions in terms of "bets," or decisions to take a long-term position of a certain size. Bets are not executed trades. For example, a decisionmaker might implement a bet by splitting it across multiple trades.

26. The second transformation is to measure the size of the bet in the dollar amount of risk transferred per unit of business time. This is more theoretically meaningful than using the dollar value or number of shares, since the underlying function of a financial market is risk transfer.

27. In addition to the two transformations, the other key foundation of the KO model is the assumption that market equilibrium leads participants to execute bets in such a way that they trade off the benefits and transaction costs of faster execution.

28. These ideas enable KO to develop two principles of invariance. First, they show that as bet activity increases, the number of bets increases twice as fast as their size. For example, if bets increase but volatility does not change in calendar time, then this invariance principle implies that volatility per unit of asset-specific business time should decline and bet size should increase. These relationships between microstructure characteristics allow KO to connect observable trading volume to unobservable order imbalances and thus to implied transaction costs, which is the relevant estimate for the purposes of calculating an asset liquidation discount. The second invariance principle is that transaction costs should always be the same function of the risk transferred. The intuition is that when an asset's distribution of bets is smaller, then it must be the case that it costs more to transact when measured as a percent of the bet. This is consistent with traders measuring transaction costs in basis points rather than dollars.

29. To provide a concrete example, suppose that the 99th percentile of bets for asset A is $10 million, perhaps reflecting 100,000 tokens at $100 per token, while the 99th percentile of bets for asset B is $1 million, perhaps reflecting 100,000 tokens at $10 per token. The first invariance principle means that bets for asset A must arrive at a rate that is 100 ($=10^2$) times larger than for asset B, since the bets differ in dollar terms by a factor of 10 but occupy the same percentile of bet size. The second invariance principle means that the transaction cost for asset B should be 10 times larger than for asset A, measured as a percent of the bet size. Therefore, the actual transaction cost in dollars will be the same when implementing the two bets. This is because the two bets have the same dollar risk transfer.[31]

[31] *See* KO, pp. 1351-1353, for the relevant mathematical expression and supplemental explanation of this example.

30. The invariance hypotheses lead to a rigorous and theoretically-founded version of the commonly used class of square root illiquidity discount models.[32] For intuition, the simplest form of these models for asset i would be the following, where δ is a scaler, σ is the standard deviation of returns in the market for the asset, X is the dollar volume of the asset that the trader wishes to sell, and V is the average volume of the asset that is traded daily in the market:

$$C_i(X) = \delta \cdot \sigma_{it} \cdot \left(\frac{X}{V_{it}}\right)^{\frac{1}{2}} \quad (1)$$

31. KO's theory leads to a generalized transaction cost equation.[33] They calibrate this model using data from the NASDAQ and the NYSE in the early 2000s. The result is a formula that can be used in general for illiquidity discounting across assets. This is Equation (2) below, based on Equation 38 from KO.

$$C_i(X) = \frac{\sigma_{it}}{0.02}\left(\frac{\kappa_0}{10^4} \cdot \left[\frac{\sigma_{it} \cdot P_{it} \cdot V_{it}}{(0.02)(40)(10^6)}\right]^{-\frac{1}{3}} + \frac{\kappa_1}{10^4} \cdot \left[\frac{X}{(0.01)V_{it}}\right]^{\frac{1}{2}}\right) \quad (2)$$

[32] Gabaix et al. (2006) provide theoretical foundation of the square-root cost function under the slow-trading assumption. Gabaix, Xavier, Parameswaran Gopikrishnan, Vasiliki Plerou, and H. Eugene Stanley, "Institutional Investors and Stock Market Volatility," *Quarterly Journal of Economics*, Vol. 121, No. 2, 2006, pp. 461-504 ("Gabaix et al. (2006)"). Empirically, trading costs as a function of trade size appear to follow a square-root form. Frazzini, Andrea, Ronen Israel, and Tobias J. Moskowitz, "Trading Costs," *Working Paper*, 2018, pp. 1-47, at p. 3 ("A formal test of [the relationship between trade size and price changes] using our data reveals a power-law function with a coefficient close to ½"); Donier, Jonathan and Julius Bonart, "A Million Metaorder Analysis of Market Impact on the Bitcoin," *Market Microstructure and Liquidity*, Vol. 1, No. 2, 2015, pp. 1-29, at p. 1 ("[Using more than one million metaorders,] we empirically confirm the "square-root law" for market impact [for Bitcoin/USD exchange market.]"), p. 2 ("Previous studies … found that the average market impact of a metaorder … approximately follows the "square-root law"). *See also*, Gabaix, Xavier, Parameswaran Gopikrishnan, Vasiliki Plerou, and H. Eugene Stanley, "A Theory of Power-Law Distributions in Financial Market Fluctuations," *Nature*, Vol. 423, 2003, pp. 267-270; Tóth, Bence, Yves Lempérière, Cyril Deremble, Joachim de Lataillade, Julien Kockelkoren, and Jean-Philippe Bouchaud, "Anomalous Price Impact and the Critical Nature of Liquidity in Financial Markets," *Physical Review X*, Vol. 1, No. 2, 2011, pp. 1-11; KO; Gatheral, Jim, "Three Models of Market Impact," *Market Microstructure and High-Frequency Data*, May 19, 2016.

[33] KO, Equation 27.

32. Intuitively, this measure of what KO term "implementation shortfall," or the price the trader gets in execution relative to the price of the asset before the transaction, has two key parameters. The first, κ_0, is the effective bid-ask spread cost, and the second is the market impact cost, κ_1, which represents the price impact of executing a trade of one percent of daily trading volume in the benchmark stock. P is the price of the asset and the other variables are as defined above. The expression $\sigma \cdot P \cdot V$ describes the level of trading activity as defined in KO. A benefit of this approach is that it requires relatively few asset-specific inputs. Specifically, I need the asset's expected volatility (σ), average daily trading volume (V), price (P), and liquidation quantity (X).

33. The remaining numbers in Equation (2) are scaling constants. The scaling constant $(0.02)(40)(10^6)$ in Equation (2) is needed because KO calibrate using a "benchmark stock" that has volatility of 2% per day, price $40 per share, and trading volume of one million shares per day. My calculated discounts do not depend on this constant. If it were to change, the coefficients κ_0 and κ_1 would have to change accordingly.

B. Estimation

34. I take Equation (2) to the data using the following measures as inputs. First, σ_{it} is the standard deviation of daily returns during the Estimation Period.[34]

35. Second, V_{it} is the average unit trading volume of the digital asset during the estimation period; and the price of the digital asset as of the Petition Time is used for P_{it}. Finally,

[34] Note this differs slightly from KO's measure in two ways. First, they use a third order moving average over three months, where each standard deviation is calculated over the previous full calendar month. I use a year because the cryptocurrency markets tend to have much higher volatility than equity markets, and short-term waves of speculative activity would drive the results if I used only one month. Second, I demean returns before calculating the standard deviation.

the FTX holdings as of the Petition Time are represented by X. For κ_0 and κ_1, the NYSE and NASDAQ "Sell" estimates from the KO model calibration results are employed.[35] For the final liquidity discount, I average the two liquidity discounts calculated using the NYSE and NASDAQ parameter estimates.

36. There are two caveats. First, for coins or tokens that are pegged to other coins or tokens, such as wrapped tokens and staked coins, as well as for non-marketable assets, I apply the illiquidity discount of the underlying. Second, I do not apply any discount to stablecoins because they are redeemable for fiat currency.

C-V. ESTIMATION OF DISCOUNT FOR LACK OF MARKETABILITY

A. Theoretical Underpinnings

37. I base my DLOM calculation on the models in Finnerty (2012) and Ghaidarov (2009).[36] These two papers adopt the same key assumptions, estimating the DLOM as the value of an Asian average-strike put option, *i.e.*, an option where the strike price is determined ex-post as the average value of the underlying asset during its term.[37] This implies that with full marketability the investor would be equally likely to sell the assets at any time during the period.

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[35] *See* Table 5 of KO. KO estimate parameters for models that only use buy orders, only use sell orders, and use all orders. They focus on the "All" model in summarizing their results because the portfolio transitions they study include both buy and sell bets. For the purposes of estimating the asset liquidation discount, only selling is relevant. Therefore, $\kappa_0 = 0.92 \cdot 10^{-4}$ and $\kappa_1 = 11.10 \cdot 10^{-4}$ from NYSE and $\kappa_0 = 4.65 \cdot 10^{-4}$ and $\kappa_1 = 10.41 \cdot 10^{-4}$ from NASDAQ are employed.

[36] Finnerty, John D., "An Average-Strike Put Option Model of the Marketability Discount," *Journal of Derivatives*, Vol. 19, No. 4, 2012, pp. 53-69 ("Finnerty (2012)"); Ghaidarov, Stillian, "Analysis and Critique of the Average Strike Put Option Marketability Discount Model," *Working Paper*, 2009, pp. 1-15 ("Ghaidarov (2009)"). I refer to their work collectively as the "Finnerty-Ghaidarov Model."

[37] Finnerty (2012); Ghaidarov (2009); Sundaram, Rangarajan and Sanjiv Das, *Derivatives: Principles and Practice*, 2nd ed., McGraw Hill Education, 2016 ("Derivatives"), p. 476.

The opportunity cost of non-marketability is the profit the investor would have earned using such a trading strategy.[38]

38. Since there is no closed-form solution for the value of an average-strike put option, Finnerty (2012) and Ghaidarov (2009) derive analytical approximations to calculate the DLOM. For assets with high volatility, as is the case for the digital assets in this matter, the approximations may result in a biased estimate of the DLOM.[39] To address this issue, I use a Monte-Carlo-simulation-based approach to solving the Finnerty-Ghaidarov model, which yields an unbiased solution.[40]

B. Estimation

39. I calculate the DLOM for each non-marketable digital asset using a simulation-based approach. For each non-marketable asset, the simulation is used to calculate the price of an Asian average-strike put option for the underlying asset, which in the Finnerty (2012) model is equal to the DLOM.[41] I run 2,500,000 iterations of each simulation.[42]

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38 Finnerty (2012).

39 For example, the DLOM using the Finnerty (2012) formula is always below 33% regardless of the length of the non-marketability period and asset volatility. The Ghaidarov (2009) approximation also appears be biased for high levels of volatility and long non-marketability horizons. Specifically, Ghaidarov (2009) suggested exact analytical upper lower bounds for the true solution of the model. However, the formula Ghaidarov (2009) proposed for approximating the point estimate of the DLOM can in fact exceed the analytical upper bound when volatility is sufficiently large, and the non-marketability period is sufficiently long.

40 Derivatives, p. 479 ("… closed-form solutions are not available for Asian option prices. One common solution to this problem is to use numerical techniques such as Monte Carlo simulation to identify the option price."); *See also,* Kemna, A.G.Z. and A.C.F. Vorst, "A Pricing Method for Options Based on Average Asset Values," *Journal of Banking and Finance*, Vol. 14, 1990, pp. 113-129 ("Kemna and Vorst (1990)").

41 The volatility of the asset is computed as the annualized standard deviation of returns of the underlying digital asset (*e.g.,* SRM for SRM_LOCKED and SRM_CUSTOM) for the one-year period ending November 1, 2022. *See* Section C-III.C for details.

42 With 2,500,000 iterations, the standard errors of the estimated DLOM are generally well below 1 percent. The token that has maximum standard error is FIDA_IEF_LOCKED with 1.3 percent around the last date of its non-marketability period.

40. For each iteration of the simulation, I begin by simulating a series of pseudo-random daily prices *S* starting at $1 from the Petition Date to the Vesting End Date. Simulated prices are assumed to follow a geometric Brownian motion with volatility σ.[43] For each non-marketable digital asset I analyze, I use the same volatility estimate as I use in the asset liquidation discount analysis.

41. I calculate the strike price of the option (K_τ) for every τ in the period $0 \leq \tau \leq T$—where *T* is the time between the Petition Date and the Vesting End Date—by taking the average value of prices in the period [0, τ] and computing the payoff of the option using the formula:

$$Payoff_\tau = \max(K_\tau - S_\tau, 0)$$

where S_τ is the price of the underlying at τ.

42. Correspondingly, I calculate the present value of the payoff as:

$$PV(Payoff_\tau) = e^{-r\tau} \max(K_\tau - S_\tau, 0)$$

43. Each iteration of the simulation produces a value of $PV(Payoff_\tau)$ for every lockup horizon τ. For each digital asset and lockup period τ, I estimate the DLOM as the average $PV(Payoff_\tau)$ across the 2,500,000 iterations of the simulation. For digital assets with linear

[43] The geometric Brownian motion is computed under a risk-neutral measure, with the risk-free rate (*r*) based on the Treasury yield as of the Petition Date with maturity corresponding to the Vesting End Date. "Daily Treasury Par Yield Curve Rates (2022)," *U.S. Department of the Treasury*, available at https://home.treasury.gov/resource-center/data-chart-center/interest-rates/TextView?type=daily_treasury_yield_curve&field_tdr_date_value=2022.

vesting schedules, such as the vesting schedules of LOCKED and CUSTOM tokens, the average DLOM across their vesting schedules can be calculated as the average DLOM over each τ.[44]

[44] τ can represent daily, weekly, monthly, or annual vesting frequencies as required. For USD_IEF_LOCKED, which has a volatility of 0%, the DLOM is instead computed as the cumulative risk-free returns foregone during the lock-up period.

Exhibit 1
Summary of Adjustments to Petition Date Prices

Category (Number of Unique Assets)		Data Sources 1	Adjustments 2	3	4
Fiat Currency (21)		Master Pricing Dataset			
Stablecoins (29)		Master Pricing Dataset			
Remaining Cryptocurrencies and Tokens (432) (excl. FTT)		Master Pricing Dataset	Asset Liquidation Discount [2]		
Non-Marketable Assets [1] (26)		Master Pricing Dataset	Asset Liquidation Discount [2]	Discount for Lack of Marketability [3]	
FTX Equity Claims and FTT (13)	**FTT**	Master Pricing Dataset	Asset Liquidation Discount [2]	Discount for Lack of Marketability [3]	100% FTX Equity and FTT Discounts
	FTX Equity	Master Pricing Dataset			100% FTX Equity and FTT Discounts
Leveraged Tokens (248)		Master Pricing Dataset			
Tokenized Stocks (57)		Master Pricing Dataset			
Spot+ Derivatives (200)		Master Pricing Dataset			
Futures (295)		Master Pricing Dataset			

Notes:

[1] I understand that prior to these Chapter 11 Cases, non-marketable assets were to be released by FTX to customer accounts according to various vesting schedules.

[2] Asset Liquidation Discount measures the cost of liquidating a digital asset. *See* Exhibit 3 and Exhibit 5 for details.

[3] Discount for Lack of Marketability ("DLOM") measures the difference in value between a marketable asset and an equivalent non-marketable asset. *See* Exhibit 4 for details.

Exhibit 2
Stablecoin Redemption and Underlying Assets

Token	Reportedly Redeemable for Fiat Currency	Underlying Redeemable Asset as of Petition Date	Stale Price*	Depegged/ Stopped Trading as of Petition Date**
[A]	[B]	[C]	[D]	[E]
1. USDT	✓	USD		
2. PAXG	✓	Gold, USD		
3. BRZ	✓	Brazilian Real		
4. XAUT	✓	Gold, USD		
5. TRYB	✓	Turkish Lira		
6. DAI	✓	USDC, GUSD, or USDP		
7. BUSD	✓	USD		
8. ANCT			✓	Stopped Trading
9. AMPL				
10. USTC				Depegged
11. EURT	✓	Euro		
12. USDP	✓	USD		
13. USDC	✓	USD		
14. TUSD	✓	USD		
15. EUROC	✓	Euro		
16. IDRT	✓	Indonesian Rupiah	✓	
17. PAR				
18. XSGD	✓	Singapore Dollar		
19. NDAU				
20. GYEN	✓	Japanese Yen		
21. ZUSD	✓	USD	✓	
22. RSV	✓	1/3 USDC, 1/3 TUSD, and 1/3 USDP		
23. USDS	✓	USDC.e, USDC, FRAX, DAI, USDT, or LUSD	✓	
24. GUSD	✓	USD		
25. XIDR	✓	Indonesian Rupiah		
26. FRAX				
27. HUSD	✓	PAX, USDC, TUSD or GUSD	✓	Depegged
28. USDF	✓	USD		
29. SAI			✓	

Notes and Sources:

* Stale Price indicates that the last trade date was before October 12, 2022.

** Based on price pattern from CoinMarketCap and Crypto.com.

21 stablecoins are redeemable for fiat currency (excluding those that depegged or stopped trading), accounting for 99.6% of Face Value of All Customer Stablecoin Claims.

Exhibit 2
Stablecoin Redemption and Underlying Assets

Notes and Sources (Cont.):
Each of the notes below contains source information on the correspondingly numbered stablecoin in the Exhibit.

[1] "Redeem TETHER tokens to fiat currency," *tether.to* , available at https://tether.to/en/redeem-tethers-to-fiat-currency/ ("Redeeming Tether tokens is depositing your Tether tokens (USDt, EURt, CNHt, MXNt) to Tether.to and receiving their values in fiat currencies (USD, EUR, CNH, MXN) into a verified bank account. To redeem your tokens, you will need: (1) A verified Tether.to account. (2) The minimum redeemable amount of Tether tokens on your account. The minimum redemption amount is 100,000 USD equivalent.").
Conditions for redemption: "You can redeem Tether USDT 1:1 on tether.to but there's a catch," *CryptoSlate* , May 12, 2022, available at https://cryptoslate.com/you-can-redeem-tether-usdt-11-on-tether-to-but-theres-a-catch/ ("To redeem Tether for fiat currency, users must go through a few steps before sending it to their bank account. However, there is a big catch that Tether fails to put in its marketing; users have to pay $150 for "verification," and the minimum transaction amount is $100,000.").

[2] "Pax Gold," *Paxos* , available at https://paxos.com/paxgold/ ("PAXG offers investors a cost-effective way to own investment-grade physical gold with all the benefits of the blockchain. Each Pax Gold (PAXG) token is backed by one fine troy ounce of gold, stored in LBMA vaults in London. If you own PAXG, you own the underlying physical gold, held in custody by Paxos Trust Company.") ("PAXG is the only gold token you can redeem for LBMA-accredited Good Delivery gold bullion bars. Institutional customers can also redeem for unallocated Loco London Gold. Redeem for USD at current gold market prices at any time.").

[3] "Brazilian Digital Token White Paper," *The Whitepaper Database* , available at https://www.allcryptowhitepapers.com/brazilian-digital-token-whitepaper/ ("The Reserve Managers keep full reserves. BRZ Tokens are always fully backed."). "BRZ Token," *BRZ* , 2023, available at https://www.brztoken.io/files/white_paper_BRZ_2023.pdf ("Every BRZ token is always fully backed by liquid BRL-denominated assets managed by independent entities known as Reserve Managers (RM). Ours publicly audited smart contract mints BRZ Tokens whenever Brazilian Reais clears the RM accounts and burns BRZ Tokens when Brazilian Reais are withdrawn, ensuring therefore at least a 1:1 parity between the outstanding BRZ Tokens and the BRL-denominated assets held by RM's. In other words, upon the deposit in Brazilian Reais into any of the Reserve Manager's accounts, an equal amount of BRZ Tokens will be minted, and immediately thereafter available for trades, transactions, and transfers easily and without friction to/with the exchanges and token dealers around the globe.").

[4] "Frequently Asked Questions," *Tether Gold* , 2023, available at https://gold.tether.to/faq ("Tether Gold (XAU₮) is a stablecoin that provides ownership on a 1:1 basis of one fine troy ounce of gold on a physical bar of gold...You can redeem your XAU₮ for actual gold..."). Holders of XAUT can request that the issuer sell the gold on their behalf for 25 basis point.

[5] "Lira-Backed TRYB Token Becomes World's Second-Largest Non-Dollar-Pegged Stablecoin," *CoinDesk* , September 1, 2023, available at https://www.coindesk.com/markets/2023/09/01/lira-backed-tryb-token-becomes-worlds-second-largest-non-dollar-pegged-stablecoin ("BiLira's TRYB stablecoin is pegged to the lira (TRY) and 100% backed by fiat reserves held in Turkish banks."). "What is BiLira," *Bilira* , January 28, 2021, available at https://www.bilira.co/help/bilira-nedir ("BiLira (TRYB) is a stable cryptocurrency pegged to the Turkish Lira. This means that you can always issue and redeem 1 TRYB for 1 Turkish Lira.").

[6] "Dai," *S&P Global Ratings* , December 12, 2023, available at https://www.spglobal.com/_assets/documents/ratings/research/101590839.pdf ("As a decentralized stablecoin, Dai cannot be redeemed by an issuer per se, although it can be redeemed against remaining collateral in the event of a shutdown of the protocol. Dai holders must rely on centralized exchanges to convert Dai into fiat U.S. dollars, or use decentralized exchanges to swap Dai for other ERC-20 tokens.") ("However, anyone can exchange Dai 1 to 1 for three other stablecoins (USDC, GUSD, and USDP) through an on-chain peg stability module.").

[7] "Understanding BUSD and Binance-Peg BUSD," *Binance Blog* , November 15, 2022, available at https://www.binance.com/en/blog/ecosystem/understanding-busd-and-binancepeg-busd-5526464425033159282 ("The asset is always available for purchase and redemption at a rate of 1 BUSD to 1 USD.").

[8] "Anchor Whitepaper," *Anchor* , January 2020, available at https://theanchor.io/wp-content/uploads/2020/02/Anchor-Stablecoin-Whitepaper-02-2020.pdf ("Anchor pegs itself to the sustainable and predictable growth trend of global GDP via a non-flationary financial index known as the Monetary Measurement Unit (MMU)."). ANCT stopped trading in summer 2022. "Anchor," *crypto.com* , available at https://crypto.com/price/anchor.

[9] "What Are Stablecoins?" *CB Insights* , January 25, 2022, available at https://www.cbinsights.com/research/report/what-are-stablecoins ("Ampleforth's algorithms adjust AMPL supply on a daily basis according to demand in an effort to avoid the volatility of fixed-supply cryptocurrencies. In the event of a surge in demand, the Ampleforth protocol will increase the supply of AMPL to bring back the equilibrium between price and supply.").

Exhibit 2
Stablecoin Redemption and Underlying Assets

Notes and Sources (Cont.):

[10] "TerraClassicUSD (USTC)," *Binance* , May 31, 2022, available at https://www.binance.com/en/research/projects/terraclassicusd ("USTC's stability mechanism depends on arbitrage activities by users. For instance, when the price of USTC falls to $0.95 in secondary markets, users can purchase 100 USTC with $95 on exchanges, and redeem these tokens on the Terra platform for LUNC tokens worth $100."). USTC became depegged in May 2022. "TerraClassicUSD," *CoinMarketCap* , available at https://coinmarketcap.com/currencies/terrausd/.

[11] "What is the EURT and how does it work?" *bit2me Academy* , March 21, 2023, available at https://academy.bit2me.com/en/que-es-el-eurt-y-como-funciona ("If you want to redeem the EURT tokens for EUR, you only need to return the amount necessary for Tether to destroy the EURT and execute a EUR transfer to the requesting account.").

[12] "Pax Dollar," *CoinMarketCap* , December 14, 2023, available at https://coinmarketcap.com/currencies/paxos-standard/ ("If a user wants to redeem USDP, they can send tokens to an address controlled by Paxos that will destroy the tokens and transfer flat currency to the user's bank account.")."How Pax Dollar works," c*rypto.com* , December 15, 2023, available at https://crypto.com/price/paxos-standard ("Available through Paxos, USDP can be exchanged or redeemed for US dollars.").

[13] "USDC is transforming finance," *coinbase.com* , 2023, available at https://www.coinbase.com/usdc ("USDC is a type of cryptocurrency that is referred to as a fiat-backed stablecoin, meaning it is backed by reserve assets in the traditional financial system, such as cash, cash equivalents, or securities. In the case of USDC, it is designed to be pegged to the US dollar and redeemable 1:1 for US dollars.").

[14] "What Is TrueUSD (TUSD)?" *Binance Academy* , July 13, 2023, available at https://academy.binance.com/en/articles/what-is-trueusd-tusd ("Easy Conversion: TUSD can be exchanged for USD. Both individual and corporate users can register to mint or redeem TUSD at any time through the official website.").

[15] "A euro stablecoin backed by full reserves," *Circle* , 2023, available at https://www.circle.com/en/eurc ("Designed for stability, EURC is 100% backed by euro held in euro-denominated bank accounts so that it's always redeemable 1:1 for euro.").

[16] "Rupiah Token," *PT Rupiah Token Indonesia* , July 2019, available at https://www.allcryptowhitepapers.com/wp-content/uploads/2019/10/whitepaper.pdf ("We also allow customers to redeem IDRT back into Indonesian Rupiah at any time - after customers send us their IDRT, we will burn the IDRT (thereby removing the tokens from circulation) and give Indonesian Rupiah back to the customer.").

[17] "What is PAR (€ stablecoin)?" *docs.mimo.capital* , available at https://docs.mimo.capital/parallel-protocol/parallel-protocol/par ("PAR are created when users deposit accepted tokens (such as WETH, WBTC, USDC, etc) as collateral in vaults and in turn receive a loan against that collateral."). "Classic Vaults," *docs.mimo.capital* , available at https://docs.mimo.capital/parallel-protocol/parallel-protocol/vaults ("The PAR & paUSD token are fully redeemable stablecoins. Borrowers can redeem and burn PAR/paUSD to repay their debt, close their Vault, and withdraw their collateral.").

[18] "Understanding XSGD/XIDR Stability: Why 100% Cash Backing Is The Best Price Stability Mechanism for Stablecoins," *StraitsX Blog* , May 24, 2022, available at https://www.straitsx.com/blog-post/understanding-xsgd-xidr-stability ("...one XSGD and one XIDR are backed by one Singapore Dollar (SGD) and one Indonesian Rupiah (IDR), respectively. Reserves for XSGD and XIDR are 100% backed by cash and are redeemable on a one-for-one basis.").

[19] "NDAU The World's First Adaptive Digital Currency," *NDAU* , 2023, available at https://ndau.io/wp-content/uploads/2023/05/ndau_whitepaper_2.07.pdf.

[20] "GYEN Digital JPY," *GMO-Z.com Trust Company, Inc.* , 2023, available at https://stablecoin.z.com/gyen ("Every GYEN issued by GMO Trust is 100%-fiat backed and always 1:1 redeemable with Japanese Yen, ensuring you are able to transact with confidence.").

[21] "ZUSD Digital USD," *GMO-Z.com Trust Company, Inc.* , 2023, available at https://stablecoin.z.com/zusd ("Every ZUSD issued by GMO Trust is backed by U.S. Dollars and U.S. Treasury Bills, and always 1:1 redeemable with U.S. Dollars, ensuring you are able to transact with confidence.").

[22] Brent, Taylor, "Tech Update: Meet RSV v2," *Reserve Blog* , October 8, 2019, available at https://blog.reserve.org/reserve-beta-launch-86855468d506 ("...each RSV is initially redeemable with the Reserve smart contracts for 1/3 TUSD + 1/3 PAX + 1/3 USDC."). "We're updating the RSV backing to USDC and BUSD," Reserve Blog, November 16, 2022, available at https://blog.reserve.org/were-updating-the-rsv-backing-to-usdc-and-busd-8bff1e466358 ("The redeemable underlying asset changed to 1/2 USDC and 1/2 BUSD in November 2022").

Exhibit 2
Stablecoin Redemption and Underlying Assets

Notes and Sources (Cont.):

[23] "Minting and Redeeming," *Sperax* , November 2023, available at https://docs.sperax.io/master/minting-and-redeeming. ("Redeeming 1 USDs at the protocol level gives the user back any one unit of collateral (maximum 1 unit of collateral) after deducting the redemption fee. Redeemers can choose from the list of eligible collaterals that they want to receive. A portion of USDs redeemed is collected as a redemption fee by the protocol."). Eligible collaterals include USDC.e, USDC, Frax, DAI, USDT and LUSD.

[24] "Gemini dollar," *gemini.com* , available at https://www.gemini.com/dollar ("Every single GUSD in circulation is fully backed by cash or cash equivalents held across bank accounts, money market funds, and US treasury bills. Gemini customers can always redeem 1 GUSD for $1 on Gemini at any time.").

[25] "Understanding XSGD/XIDR Stability: Why 100% Cash Backing Is The Best Price Stability Mechanism for Stablecoins," *StraitsX Blog* , May 24, 2022, available at https://www.straitsx.com/blog-post/understanding-xsgd-xidr-stability ("...one XSGD and one XIDR are backed by one Singapore Dollar (SGD) and one Indonesian Rupiah (IDR) respectively. Reserves for XSGD and XIDR are 100% backed by cash and are redeemable on a one-for-one basis.").

[26] "Frax (FRAX): A New Kind of Stablecoin," *Cryptopedia* , October 2023, available at https://www.gemini.com/cryptopedia/frax-crypto-protocol-asset-backed-algorithmic-stablecoins#section-how-frax-tokens-are-minted ("This mechanism works in reverse when a user chooses to redeem their FRAX for the USDC and FXS they initially provided. In this case, again with a 50% collateral ratio, a user is given $0.50 USDC and $0.50 of FXS in exchange for every FRAX stablecoin they provided."). FXS is the FRAX protocol's governance token.

[27] "Huobi Introduces HUSD — The Universal Stablecoin Providing Maximum Stability," *Medium* , October 23, 2018, available at https://medium.com/swlh/huobi-introduces-husd-the-universal-stablecoin-providing-maximum-stability-272c9bf24831 ("To ensure maximum efficiency and convenience for its users, Huobi Global is launching Huobi HUSD- their uniform platform stablecoin solution. HUSD allows users to make deposits and withdrawals in any of the stablecoins explained above [which includes PAX, USDC, TUSD and GUSD]"). HUSD became depegged in early November 2022. "HUSD," *CoinMarketCap* , available at https://coinmarketcap.com/currencies/husd/.

[28] "FolgoryUSD," *CoinMarketCap* , December 14, 2023, available at https://coinmarketcap.com/currencies/folgoryusd/ ("USDF is reportedly issued by Hashfort, and backed by fully reserved assets, and redeemable on a 1: 1 basis for US dollars.").

[29] SAI is "backed by ETH." "Sai Price Chart (SAI)," *Coinstats* , available at https://coinstats.app/coins/sai/. *See also* "MakerDAO shuts down the Single-Collateral DAI system," Yahoo Finance, May 12, 2020, available at https://finance.yahoo.com/news/makerdao-shuts-down-single-collateral-195946276.html.

Exhibit 3
Asset Liquidation Discounts
Assets With Asset Liquidation Discount Greater Than 10% (Excluding Non-Marketable, FTT, and FTX Equity Tokens)

		As of Petition Date (11/11/2022)		Discounts			
	Asset [1]	Price [2]	Debtors' Holdings ($MM) [1]	Asset Liquidation Discount [3]	Discount for Lack of Marketability [4]	FTX Equity and FTT Discounts [5]	Total Discount [6]
	[A]	[B]	[C]	[D]	[E]	[F]	[G]
			$5,394.88				
1.	ALEPH	$0.06	$3.86	20.30%	0.00%	0.00%	20.30%
2.	ASD	$0.07	$5.53	18.40%	0.00%	0.00%	18.40%
3.	ATLAS	+$0.00	$8.93	16.97%	0.00%	0.00%	16.97%
4.	AURY	$0.51	$1.48	13.37%	0.00%	0.00%	13.37%
5.	BAO	+$0.00	$5.65	21.54%	0.00%	0.00%	21.54%
6.	BLT	$0.04	$1.47	29.06%	0.00%	0.00%	29.06%
7.	BOBA	$0.22	$32.83	25.03%	0.00%	0.00%	25.03%
8.	CHI	$0.13	$0.23	10.79%	0.00%	0.00%	10.79%
9.	CIM	$0.01	$0.13	100.00%	0.00%	0.00%	100.00%
10.	CLRX	$0.20	$1.14	100.00%	0.00%	0.00%	100.00%
11.	COPE	$0.01	$0.05	22.69%	0.00%	0.00%	22.69%
12.	COT	$0.04	$0.06	51.62%	0.00%	0.00%	51.62%
13.	CPH	$0.03	$0.22	14.07%	0.00%	0.00%	14.07%
14.	CRT	$0.11	$0.07	17.15%	0.00%	0.00%	17.15%
15.	DFL	+$0.00	$0.14	28.82%	0.00%	0.00%	28.82%
16.	DMG	$0.01	$0.14	16.61%	0.00%	0.00%	16.61%
17.	DS	+$0.00	+$0.00	100.00%	0.00%	0.00%	100.00%
18.	EMB	$0.02	$0.67	23.30%	0.00%	0.00%	23.30%
19.	EUL	$6.18	$4.39	14.31%	0.00%	0.00%	14.31%
20.	FIDA	$0.23	$80.99	36.76%	0.00%	0.00%	36.76%
21.	FLIXX	+$0.00	+$0.00	100.00%	0.00%	0.00%	100.00%
22.	GENE	$1.75	$1.34	28.71%	0.00%	0.00%	28.71%
23.	GOG	$0.10	$1.67	17.81%	0.00%	0.00%	17.81%
24.	GRNC	$0.12	$0.01	33.60%	0.00%	0.00%	33.60%
25.	GZIL	$5.80	+$0.00	16.45%	0.00%	0.00%	16.45%
26.	HMT	$0.05	$1.04	14.62%	0.00%	0.00%	14.62%
27.	HOLY	$1.28	$0.09	11.44%	0.00%	0.00%	11.44%
28.	HXRO	$0.05	$5.51	31.75%	0.00%	0.00%	31.75%
29.	HYDRO	+$0.00	$0.02	100.00%	0.00%	0.00%	100.00%
30.	IDH	+$0.00	+$0.00	66.30%	0.00%	0.00%	66.30%

Exhibit 3
Asset Liquidation Discounts
Assets With Asset Liquidation Discount Greater Than 10% (Excluding Non-Marketable, FTT, and FTX Equity Tokens)

		As of Petition Date (11/11/2022)		Discounts			
	Asset [1]	Price [2]	Debtors' Holdings ($MM) [1]	Asset Liquidation Discount [3]	Discount for Lack of Marketability [4]	FTX Equity and FTT Discounts [5]	Total Discount [6]
	[A]	[B]	[C]	[D]	[E]	[F]	[G]
31.	INDI	$0.13	$1.74	19.71%	0.00%	0.00%	19.71%
32.	IP3	$0.29	$1.28	14.97%	0.00%	0.00%	14.97%
33.	JET	$0.08	$4.78	28.88%	0.00%	0.00%	28.88%
34.	KIN	+$0.00	$4.02	13.03%	0.00%	0.00%	13.03%
35.	KLUNC	$0.19	$0.00	17.98%	0.00%	0.00%	17.98%
36.	LND	+$0.00	+$0.00	100.00%	0.00%	0.00%	100.00%
37.	LUA	$0.01	$0.53	10.00%	0.00%	0.00%	10.00%
38.	LUNC	+$0.00	$7.73	17.98%	0.00%	0.00%	17.98%
39.	MAGIC	$0.27	$0.24	10.17%	0.00%	0.00%	10.17%
40.	MAPS	$0.10	$992.96	100.00%	0.00%	0.00%	100.00%
41.	MATH	$0.11	$0.87	11.80%	0.00%	0.00%	11.80%
42.	MEDIA	$4.75	$47.44	53.23%	0.00%	0.00%	53.23%
43.	MER	$0.01	$1.32	33.76%	0.00%	0.00%	33.76%
44.	MNGO	$0.01	$3.32	28.61%	0.00%	0.00%	28.61%
45.	MPLX	$0.06	$3.34	21.25%	0.00%	0.00%	21.25%
46.	MSRM	$372,246.54	$0.00	58.32%	0.00%	0.00%	58.32%
47.	MTC	$0.10	$1.25	37.51%	0.00%	0.00%	37.51%
48.	MYC	$0.03	$0.39	21.02%	0.00%	0.00%	21.02%
49.	NPLC	+$0.00	+$0.00	43.90%	0.00%	0.00%	43.90%
50.	NUC	$0.38	$76.73	100.00%	0.00%	0.00%	100.00%
51.	OXY	$0.03	$314.08	100.00%	0.00%	0.00%	100.00%
52.	PLG	+$0.00	$2.23	41.80%	0.00%	0.00%	41.80%
53.	POLIS	$0.22	$5.59	17.90%	0.00%	0.00%	17.90%
54.	PORT	$0.03	$0.24	17.50%	0.00%	0.00%	17.50%
55.	PTU	$0.90	$1.33	58.78%	0.00%	0.00%	58.78%
56.	QASH	$0.02	$4.07	42.65%	0.00%	0.00%	42.65%
57.	REDI	+$0.00	+$0.00	100.00%	0.00%	0.00%	100.00%
58.	ROOK	$14.21	$0.57	13.46%	0.00%	0.00%	13.46%
59.	SLND	$0.39	$2.31	23.36%	0.00%	0.00%	23.36%
60.	SLRS	+$0.00	$0.16	16.37%	0.00%	0.00%	16.37%
61.	SPDR	+$0.00	+$0.00	48.29%	0.00%	0.00%	48.29%
62.	SRM	$0.37	$3,703.74	58.32%	0.00%	0.00%	58.32%
63.	STEP	$0.01	$0.59	12.75%	0.00%	0.00%	12.75%

Exhibit 3
Asset Liquidation Discounts
Assets With Asset Liquidation Discount Greater Than 10% (Excluding Non-Marketable, FTT, and FTX Equity Tokens)

		As of Petition Date (11/11/2022)		Discounts			
	Asset [1]	Price [2]	Debtors' Holdings ($MM) [1]	Asset Liquidation Discount [3]	Discount for Lack of Marketability [4]	FTX Equity and FTT Discounts [5]	Total Discount [6]
	[A]	[B]	[C]	[D]	[E]	[F]	[G]
64.	STG	$0.39	$40.76	15.23%	0.00%	0.00%	15.23%
65.	SYN	$0.59	$3.12	18.44%	0.00%	0.00%	18.44%
66.	TULIP	$1.66	$0.98	16.32%	0.00%	0.00%	16.32%
67.	XCF	+$0.00	+$0.00	100.00%	0.00%	0.00%	100.00%
68.	XPLA	$0.29	$9.51	82.17%	0.00%	0.00%	82.17%
69.	XPT	+$0.00	+$0.00	100.00%	0.00%	0.00%	100.00%
70.	ZPR	+$0.00	+$0.00	17.95%	0.00%	0.00%	17.95%
71.	ZWAP	$1.64	+$0.00	21.93%	0.00%	0.00%	21.93%

Notes and Sources:
The asset liquidation discount measures the cost of liquidating a digital asset.
"+" sign before zero indicates that the values are non-zero positive numbers, but rounded to zero in the table.
[1] From Coin Report Dataset.
[2] From Master Pricing Dataset.
[3] The asset liquidation discount calculations are based on Kyle and Obizhaeva (2016). Inputs for the calculations are the trading volume of assets, the volatility of asset returns, Petition Time prices, and the quantity of Debtors' holdings as of the Petition Date. *See* Appendix C.
[4] *See* Exhibit 4 for more information on Discount for Lack of Marketability calculations.
[5] Equal to 100% for FTT, its non-marketable versions, and assets labeled as "FTX Equity" in Master Pricing Dataset. For others, equal to zero percent.
[6] [G] = 1 - (1 - [D]) × (1 - [E]) × (1 - [F]).

Exhibit 4A: Non-Marketable Assets — LOCKED Digital Assets

			Vesting Schedule [3]				Discounts			
	Asset [1]	Price [2]	Frequency [4]	Vesting Start	Vesting End	Vesting Period [5] (Days)	Asset Liquidation Discount [6]	Discount for Lack of Marketability [7]	FTX Equity and FTT Discounts [8]	Total Discount [9]
	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]
1.	ATLAS_IEF_LOCKED	+$0.00	Monthly	8/11/2022	8/11/2027	1,734	16.97%	32.67%	0.00%	44.09%
2.	BOBA_LOCKED	$0.22	3-months	9/20/2022	9/20/2025	1,044	25.03%	31.15%	0.00%	48.38%
3.	FIDA_IEF_LOCKED	$0.23	Monthly	8/11/2022	8/11/2027	1,734	36.76%	47.71%	0.00%	66.93%
4.	FIDA_LOCKED	$0.23	Daily	12/14/2021	12/14/2024	764	36.76%	34.11%	0.00%	58.33%
5.	FTT_LOCKED [10]	$2.69	-	-	-	-	23.13%	0.00%	100.00%	100.00%
6.	LUNA2_LOCKED [11]	$1.68	-	-	-	751	0.00%	49.64%	0.00%	49.64%
7.	MAPS_IEF_LOCKED	$0.10	Monthly	8/11/2022	8/11/2027	1,734	100.00%	42.42%	0.00%	100.00%
8.	MAPS_LOCKED	$0.10	Weekly	12/15/2021	12/15/2027	1,860	100.00%	43.33%	0.00%	100.00%
9.	MEDIA_LOCKED	$4.75	Daily	5/1/2022	5/1/2028	1,998	53.23%	21.12%	0.00%	63.10%
10.	MSRM_LOCKED [12]	$372,246.54	-	-	-	1,734	58.32%	32.62%	0.00%	71.92%
11.	OXY_IEF_LOCKED	$0.03	Monthly	8/11/2022	8/11/2027	1,734	100.00%	40.22%	0.00%	100.00%
12.	OXY_LOCKED	$0.03	Weekly	12/18/2021	12/18/2026	1,498	100.00%	37.79%	0.00%	100.00%
13.	POLIS_IEF_LOCKED [13]	$0.22	-	-	-	1,734	17.90%	31.20%	0.00%	43.52%
14.	PYTH_IEF_LOCKED [14]	$0.00	-	-	-	-	0.00%	0.00%	0.00%	0.00%
15.	PYTH_LOCKED [14]	$0.00	-	-	-	-	0.00%	0.00%	0.00%	0.00%
16.	RAY_IEF_LOCKED	$0.25	Monthly	8/11/2022	8/11/2027	1,734	0.00%	29.82%	0.00%	29.82%
17.	SOL_IEF_LOCKED	$16.25	Monthly	8/11/2022	8/11/2027	1,734	0.00%	35.20%	0.00%	35.20%
18.	SRM_IEF_LOCKED	$0.37	Monthly	8/11/2022	8/11/2027	1,734	58.32%	32.79%	0.00%	71.99%
19.	SRM_LOCKED	$0.37	Daily	8/11/2021	8/11/2027	1,734	58.32%	32.62%	0.00%	71.92%
20.	UBXT_LOCKED [15]	+$0.00	-	-	-	-	0.00%	0.00%	0.00%	0.00%
21.	USD_IEF_LOCKED [16]	$1.00	-	-	-	1,734	0.00%	16.81%	0.00%	16.81%

Notes and Sources:

Discount for Lack of Marketability ("DLOM") measures the difference in value between a marketable asset and an equivalent non-marketable asset.

"+" sign before zero indicates that the values are non-zero positive numbers, but rounded to zero in the table. Dashes indicate missing data.

[1] Only digital assets with the "_LOCKED" suffix are included in this analysis. I assume that the price of each asset is the same as the price of the underlying asset, and compute DLOM using the volatility of the underlying asset.

[2] From Master Pricing Dataset.

[3] From "CUSTOM Token Data - Account Identifiers 11.11.23 (Clean).xlsx" at tab "Unlock Schedules."

[4] The digital assets in this Exhibit vest linearly. Therefore, a fixed quantity of each digital asset vests at equally-spaced times from the vesting start until the vesting end date.

[5] Vesting period refers to the number of days between the Petition Date and the Vesting End Date in [E].

[6] For each non-marketable asset, the asset liquidation discount is the same as that of the underlying asset. *See* Exhibit 3 and Exhibit 5 for the asset liquidation discounts of the underlying assets.

Exhibit 4A: Non-Marketable Assets — LOCKED Digital Assets

[7] Calculated by taking the mean DLOM over the duration of each asset's vesting schedule. For a given non-marketability period, the DLOM is calculated as the average present value of 2.5 million Monte Carlo-simulated payoffs for an average strike put option. Inputs to the Monte Carlo simulations are the length of the non-marketability period, the volatility of asset returns, and risk-free rates. *See* Appendix C.

[8] For FTT, equal to 100 percent. For others, equal to zero percent.

[9] [J] = 1 - (1 - [G]) × (1 - [H]) × (1 - [I]).

[10] I understand that FTT was fully unlocked as of May 1, 2022. Therefore, no DLOM is applied to FTT_LOCKED. *See* "FTT Unlock Schedules," *FTX* (via Wayback Machine), accessed November 29, 2023, available at https://web.archive.org/web/20221127141057/https://help.ftx.com/hc/en-us/articles/360031160031-FTT-Unlock-Schedules.

[11] The LUNA2_LOCKED vesting schedule is specific to individual customers as a function of their holdings on the Terra Classic chain prior to UST's depegging from the USD in May 2022. For computing the DLOM, I assume the modal vesting period of 2 years from December 2022, which accounts for at least half of all locked LUNA. *See* "LUNA 2.0 listing and Terra airdrop distribution schedule," *Cryptohopper* , May 30, 2022, available at https://www.cryptohopper.com/news/luna-2-0-listing-and-terra-airdrop-distribution-schedule-6635.

[12] MSRM_LOCKED is equivalent to 1 million SRM_LOCKED, and therefore assumed to have the same vesting schedule and input parameters as SRM for DLOM computation.

[13] POLIS_IEF_LOCKED is assumed to have the same vesting schedule as the other IEF digital assets in the data.

[14] No DLOM is applied to digital assets with a price of zero.

[15] I understand that UBXT was fully unlocked as of August 2, 2021. Therefore, no DLOM is applied to UBXT_LOCKED. *See* "3 profitable things you can do with UBXT TODAY!" *UpBots* (via Medium), August 6, 2021, available at https://medium.com/upbotscom/3-profitable-things-you-can-do-with-ubxt-today-fccb84e609df ("As of August 2, 2021, our UBXT staking program on FTX has come to a close. If you had staked or locked UBXT your funds should now be unlocked.").

[16] USD_IEF_LOCKED is assumed to have the same vesting schedule as the other IEF digital assets in the data. Consistent with my understanding that the underlying asset for USD_IEF_LOCKED is USD, the DLOM for this asset is computed as the cumulative risk-free rate foregone due to the asset's lack of marketability.

Exhibit 4B: Non-Marketable Assets — CUSTOM Tokens

			Vesting Schedule [4]				Discounts			
Customer ID [1]	Token [2]	Price [3]	Frequency [5]	Vesting Start	Vesting End	Vesting Period [6] (Days)	Asset Liquidation Discount [7]	Discount for Lack of Marketability [8]	FTX Equity and FTT Discounts [9]	Total Discount [10]
[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]
1. 151162	FTT_CUSTOM	$2.69	Daily	8/3/2021	2/1/2023	82	23.13%	5.46%	100.00%	100.00%
2. 160222	FTT_CUSTOM	$2.69	Daily	8/3/2021	2/1/2023	82	23.13%	5.46%	100.00%	100.00%
3. 175907 [11]	FTT_CUSTOM	$2.69	Daily	-	-	720	23.13%	15.95%	100.00%	100.00%
4. 205992 [11]	FTT_CUSTOM	$2.69	Daily	-	-	720	23.13%	15.95%	100.00%	100.00%
5. 713123 [11]	FTT_CUSTOM	$2.69	Daily	-	-	720	23.13%	15.95%	100.00%	100.00%
6. 1743405	FTT_CUSTOM	$2.69	Daily	2/22/2022	2/22/2025	834	23.13%	17.13%	100.00%	100.00%
7. 1785423	FTT_CUSTOM	$2.69	Daily	1/28/2021	1/8/2028	1,884	23.13%	25.16%	100.00%	100.00%
8. 266388	MAPS_CUSTOM	$0.10	Weekly	1/30/2022	2/1/2024	447	100.00%	23.39%	0.00%	100.00%
9. 266388	OXY_CUSTOM	$0.03	Weekly	3/12/2022	3/16/2024	491	100.00%	23.09%	0.00%	100.00%
10. 289114	OXY_CUSTOM	$0.03	Weekly	12/11/2021	12/11/2026	1,491	100.00%	37.65%	0.00%	100.00%
11. 289114	SRM_CUSTOM	$0.37	Daily	8/1/2021	8/1/2027	1,724	58.32%	32.55%	0.00%	71.89%
12. 368185	SRM_CUSTOM	$0.37	Daily	10/13/2021	10/13/2025	1,067	58.32%	26.24%	0.00%	69.26%
13. 374171 [12]	SRM_CUSTOM	$0.37	Daily	-	-	1,737	58.32%	32.66%	0.00%	71.93%
14. 408404	SRM_CUSTOM	$0.37	Daily	8/30/2022	8/30/2028	2,119	58.32%	35.60%	0.00%	73.16%
15. 410499	SRM_CUSTOM	$0.37	Daily	8/30/2022	8/30/2028	2,119	58.32%	35.60%	0.00%	73.16%
16. 2588067	SRM_CUSTOM	$0.37	Daily	3/25/2022	3/25/2029	2,326	58.32%	37.02%	0.00%	73.75%
17. 2791093 [12]	SRM_CUSTOM	$0.37	Daily	-	-	1,737	58.32%	32.66%	0.00%	71.93%
18. 3064436	SRM_CUSTOM	$0.37	Daily	10/13/2021	10/13/2025	1,067	58.32%	26.24%	0.00%	69.26%

Notes and Sources:

Discount for Lack of Marketability ("DLOM") measures the difference in value between a marketable asset and an equivalent non-marketable asset.

Dashes indicate missing data.

[1] From "balances_valuations_092823 (Clean).csv."

[2] Only tokens with the "_CUSTOM" suffix are included in this analysis. I assume that the price of each asset is the same as the price of the underlying asset, and compute DLOM using the volatility of the underlying asset.

[3] From Master Pricing Dataset.

[4] From "CUSTOM Token Data - Account Identifiers 11.11.23 (Clean).xlsx" at tab "Account Identifiers."

[5] The tokens in this Exhibit vest linearly. Therefore, a fixed quantity of each token vests at equally-spaced times from the vesting start until the vesting end date.

[6] Vesting period refers to the number of days between the Petition Date and the Vesting End Date in [F].

[7] For each non-marketable token, the asset liquidation discount is the same as that of the underlying token. *See* Exhibit 3 and Exhibit 5 for the asset liquidation discounts of the underlying tokens.

[8] Calculated by taking the mean DLOM over the duration of each asset's vesting schedule. For a given non-marketability period, the DLOM is calculated as the average present value of 2.5 million Monte Carlo-simulated payoffs for an average strike put option. Inputs to the Monte Carlo simulations are the length of the non-marketability period, the volatility of asset returns, and risk-free rates. *See* Appendix C.

Exhibit 4B: Non-Marketable Assets — CUSTOM Tokens

[9] For FTT, equal to 100 percent. For others, equal to zero percent.
[10] [K] = 1 - (1- [H]) × (1 - [I]) × (1 - [J]).
[11] Due to missing vesting schedule, Vesting Period used in DLOM computation is assumed to equal the average of vesting periods of other FTT_CUSTOM claims.
[12] Due to missing vesting schedule, Vesting Period used in DLOM computation is assumed to equal the average of vesting periods of other SRM_CUSTOM claims.

Exhibit 4C: Non-Marketable Assets — Options

				Discounts		
Asset [1]	Underlying Asset [2]	Price [3]	Asset Liquidation Discount [4]	Discount for Lack of Marketability [5]	FTX Equity and FTT Discounts [6]	Total Discount [7]
[A]	[B]	[C]	[D]	[E]	[F]	[G]
1. FTT_STRIKE-0.4_EXERCISE-2030-1	FTT	$2.69	23.13%	18.16%	100.00%	100.00%
2. FTT_STRIKE-0.4_EXERCISE-2030-2			23.13%	15.72%	100.00%	100.00%
3. FTT_STRIKE-0.4_UNLOCK-EXPIRE-2030-1	FTT	$2.69	23.13%	18.16%	100.00%	100.00%
4. FTT_STRIKE-0.4_UNLOCK-EXPIRE-2030-2			23.13%	15.72%	100.00%	100.00%
5. LOCKED_MAPS_STRIKE-0.07_VEST-2030-1	MAPS	$0.10	100.00%	33.07%	0.00%	100.00%
6. LOCKED_MAPS_STRIKE-0.07_VEST-2030-2			100.00%	27.88%	0.00%	100.00%
7. LOCKED_OXY_STRIKE-0.03_VEST-2030-1	OXY	$0.03	100.00%	31.15%	0.00%	100.00%
8. LOCKED_OXY_STRIKE-0.03_VEST-2030-2			100.00%	26.37%	0.00%	100.00%
9. LOCKED_SRM_STRIKE-0.1_VEST-2030-1	SRM	$0.37	58.32%	24.89%	0.00%	68.70%
10. LOCKED_SRM_STRIKE-0.1_VEST-2030-2			58.32%	21.32%	0.00%	67.21%

Notes and Sources:

Discount for Lack of Marketability ("DLOM") measures the difference in value between a marketable asset and an equivalent non-marketable asset.

[1] The assets included in this analysis are from the file "All Locked Agreements 12.15.23.xlsx." I understand that these assets were options for which different customers had different vesting schedules that generally fell into two categories: (1) the options were to vest in a single installment on January 1, 2024 (denoted with the suffix "-1" in the Exhibit), or (2) the options were to vest over a five-year annual vesting schedule beginning January 1, 2022 and ending January 1, 2026 (denoted with the suffix "-2" in the Exhibit). I treat these options as if they were equivalent to the underlying asset, and I compute DLOM for each option for each of these two vesting schedules.

[2] I assume that the price of each asset is the same as the price of the underlying asset, and compute DLOM using the volatility of the underlying asset.

[3] From Master Pricing Dataset.

[4] For each non-marketable digital asset, the asset liquidation discount is the same as that of the underlying asset. *See* Exhibit 3 and Exhibit 5 for the asset liquidation discounts of the underlying assets.

[5] Calculated by taking the mean DLOM over the duration of each asset's vesting schedule. For a given non-marketability period, the DLOM is calculated as the average present value of 2.5 million Monte Carlo-simulated payoffs for an average strike put option. Inputs to the Monte Carlo simulations are the length of the non-marketability period, the volatility of asset returns, and risk-free rates. *See* Appendix C.

[6] For FTT, equal to 100 percent. For others, equal to zero percent.

[7] [G] = 1 - (1- [D]) × (1 - [E]) × (1 - [F]).

Exhibit 5
FTX Equity and FTT Discounts

		As of Petition Date (11/11/2022)		Discounts			
	Asset [1]	Price [2]	Debtors' Holdings ($MM) [3]	Asset Liquidation Discount [4]	Discount for Lack of Marketability [5]	FTX Equity and FTT Discounts	Total Discount [6]
	[A]	[B]	[C]	[D]	[E]	[F]	[G]
1.	FTX TOKEN (FTT)	$2.69	$722.47	23.13%	0.00%	100.00%	100.00%
2.	FTT_LOCKED	$2.69	$0.00	23.13%	0.00%	100.00%	100.00%
3.	FTT_CUSTOM [7]	$2.69	$0.00	23.13%	5.46% - 25.16%	100.00%	100.00%
4.	FTT_R3	$2.69	$0.00	23.13%	0.00%	100.00%	100.00%
5.	FTX EQUITY	$23.66	$0.00	-	-	100.00%	100.00%
6.	WEST REALM EQUITY	$0.33	$0.00	-	-	100.00%	100.00%
7.	WEST REALM EQUITY POSTSPLIT	$0.33	$0.00	-	-	100.00%	100.00%
8.	FTX EQUITY STRIKE-2.28 VEST-2022 EXPIRE-2030	$23.66	$0.00	-	-	100.00%	100.00%
9.	FTX EQUITY OPTIONS PER AWARD AGREEMENTS PENDING MAY 2021	$23.66	$0.00	-	-	100.00%	100.00%
10.	WEST REALM EQUITY STRIKE-0.33 EXPIRE-2030	$0.33	$0.00	-	-	100.00%	100.00%
11.	WEST REALM EQUITY OPTIONS PER AWARD AGREEMENTS PENDING MAY 2021	$0.33	$0.00	-	-	100.00%	100.00%

Notes and Sources:

"+" sign before zero indicates that the values are non-zero positive numbers, but rounded to zero in the table.

[1] Assets shown in exhibit include FTT, its non-marketable versions, and assets labeled as "FTX Equity" in Master Pricing Dataset. I present discounts applied to FTT options in Exhibit 4C.

[2] From Master Pricing Dataset.

[3] From Coin Report Dataset.

[4] *See* Exhibit 3 and Appendix C for more information the calculation of asset liquidation discounts.

[5] *See* Exhibit 4 and Appendix C for more information on the calculation of discounts for lack of marketability.

[6] [G] = 1 - (1 - [D]) × (1 - [E]) × (1 - [F]).

[7] The DLOM value for FTT_CUSTOM is shown as a range since it has different vesting schedules for different customers. *See* Exhibit 4B for the customer-level DLOM calculations.

[8] "-" represents values not calculated due to missing input data for the calculations.

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Fiat Currency	
1.	ARS	$0.0062360
2.	AUD	$0.6619000
3.	BRL	$0.1871000
4.	CAD	$0.7506000
5.	CHF	$1.0380000
6.	CNY	$0.1391000
7.	EUR	$1.0210000
8.	GBP	$1.1692000
9.	GHS	$0.0693240
10.	HKD	$0.1275000
11.	IDR	$0.0000637
12.	INR	$0.0124090
13.	JPY	$0.0070930
14.	MXN	$0.0517670
15.	PHP	$0.0171810
16.	SGD	$0.7235000
17.	TRY	$0.0540910
18.	USD	$1.0000000
19.	VND	$0.0000400
20.	XOF	$0.0015310
21.	ZAR	$0.0575800
	Stablecoins	
22.	AMPL	$0.9668414
23.	ANCT**	$0.0000000
24.	BRZ	$0.1562968
25.	BUSD	$0.9999760
26.	DAI	$0.9997000
27.	EUROC	$1.0265000
28.	EURT	$1.0248257
29.	FRAX	$0.9880101
30.	GUSD	$0.9978045
31.	GYEN	$0.0071050
32.	HUSD**	$0.0000000
33.	IDRT	$0.0000634
34.	NDAU	$15.5416983
35.	PAR	$1.0258451
36.	PAXG	$1,753.4508600
37.	RSV	$0.9969920
38.	SAI**	$0.0000000
39.	TRYB	$0.0509070
40.	TUSD	$0.9978553
41.	USDC	$1.0000000
42.	USDF	$1.0000000
43.	USDP	$0.9990984
44.	USDS	$0.9950000
45.	USDT	$0.9975910

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Stablecoin (Cont.)	
46.	USTC	$0.0239415
47.	XAUT	$1,757.4000000
48.	XIDR	$0.0000645
49.	XSGD	$0.7082000
50.	ZUSD	$1.0000000
	Remaining Cryptocurrencies and Tokens (excl. FTT)	
51.	1INCH	$0.5506265
52.	1WO**	$0.0000000
53.	AAVE	$63.9206190
54.	ABBC	$0.1642675
55.	ABEY	$0.6159533
56.	ADA	$0.3497920
57.	ADH**	$0.0000000
58.	AFCWIN-SB-2021	$0.0000000
59.	AGLD	$0.2463000
60.	AKRO	$0.0026846
61.	ALBT	$0.0478631
62.	ALCX	$17.5644480
63.	ALEPH*	$0.0505381
64.	ALGO	$0.2959040
65.	ALICE	$1.1828905
66.	ALPHA	$0.0912154
67.	ALX**	$0.0000000
68.	AMLT**	$0.0000000
69.	AMN**	$0.0000000
70.	ANC	$0.0531424
71.	ANW	$0.0007285
72.	APE	$3.1755724
73.	APT	$4.7424485
74.	AR	$9.5507643
75.	ARE**	$0.0000000
76.	ARST**	$0.0000000
77.	ARV	$0.0001056
78.	ASD*	$0.0544898
79.	ASM	$0.0160900
80.	ATLAS*	$0.0024908
81.	ATOM	$11.5991618
82.	AUDIO	$0.1566829
83.	AURY*	$0.4435395
84.	AVAX	$14.1912756
85.	AXS	$6.8561913
86.	BAAS	$0.0005289
87.	BADGER	$2.6147338
88.	BAL	$5.2393950
89.	BAND	$2.2614453
90.	BAO*	$0.0000828

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Remaining Cryptocurrencies and Tokens (excl. FTT) (Cont.)	
91.	BAR	$3.9021409
92.	BAT	$0.2526885
93.	BCH	$102.2131116
94.	BCHA	$0.0000300
95.	BEAM	$0.1138695
96.	BERRY	$0.0006108
97.	BF_POINT**	$0.0000000
98.	BFC	$0.0738605
99.	BICO	$0.2864203
100.	BIFI	$0.0068162
101.	BIT	$0.3165593
102.	BLT*	$0.0296820
103.	BMC**	$0.0000000
104.	BNB	$286.5200580
105.	BNT	$0.3792324
106.	BOBA*	$0.1655042
107.	BRC**	$0.0000000
108.	BRLT**	$0.0000000
109.	BSV	$38.2825128
110.	BTC	$16,871.6300000
111.	BTCV	$2.5096431
112.	BTRN**	$0.0000000
113.	BTT	$0.0000007
114.	C98	$0.2040890
115.	CAN	$0.0004910
116.	CAPS	$0.0086027
117.	CEL	$0.6219474
118.	CHI*	$0.1126626
119.	CHR	$0.1122728
120.	CHZ	$0.2197552
121.	CIM*	$0.0000000
122.	CITY	$4.6107138
123.	CLRX*	$0.0000000
124.	CLV	$0.0598594
125.	CMCT**	$0.0000000
126.	COMP	$37.9232400
127.	CONV	$0.0005770
128.	COPE*	$0.0048746
129.	COT*	$0.0185909
130.	CPH*	$0.0226642
131.	CQT	$0.0874388
132.	CRE	$0.0028662
133.	CREAM	$6.8911210
134.	CRO	$0.0875500
135.	CRPT	$0.0782117
136.	CRT*	$0.0912037
137.	CRV	$0.6516809

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Remaining Cryptocurrencies and Tokens (excl. FTT) (Cont.)	
138.	CTK	$0.7734423
139.	CTX	$2.2718017
140.	CUDOS	$0.0034291
141.	CUSDT	$0.0218002
142.	CVC	$0.0911835
143.	CVX	$4.0218594
144.	DACS**	$0.0000000
145.	DAG	$0.0491076
146.	DASH	$35.5184641
147.	DAWN	$0.7468876
148.	DENT	$0.0006846
149.	DEXA	$0.0000213
150.	DFL*	$0.0008323
151.	DIA	$0.2999928
152.	DMG*	$0.0075960
153.	DODO	$0.1128715
154.	DOGE	$0.0828523
155.	DOT	$5.6705792
156.	DRG**	$0.0000000
157.	DS*	$0.0000000
158.	DYDX	$1.9869782
159.	EARTH**	$0.0000000
160.	ECH**	$0.0000000
161.	EDEN	$0.0804372
162.	EGLD	$45.2084940
163.	ELY**	$0.0000000
164.	EMB*	$0.0147266
165.	ENJ	$0.3445027
166.	ENS	$12.2252550
167.	EOS	$0.9051769
168.	ETC	$21.0673578
169.	ETH	$1,258.8400000
170.	ETHW	$4.1505988
171.	ETN	$0.0023543
172.	EUL*	$5.2959756
173.	EWT	$3.4440290
174.	EZT**	$0.0000000
175.	FCT	$0.5845263
176.	FDX**	$0.0000000
177.	FIDA*	$0.1456669
178.	FIL	$4.3670766
179.	FIO	$0.0300062
180.	FLEX**	$0.0000000
181.	FLIXX*	$0.0000000
182.	FLOKI	$0.0000078
183.	FRONT	$0.1701556
184.	FTM	$0.1917738

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Remaining Cryptocurrencies and Tokens (excl. FTT) (Cont.)	
185.	FTX	$0.0036174
186.	FUSE	$0.0678327
187.	FXS	$5.1236807
188.	GAL	$1.5049689
189.	GALA	$0.0308076
190.	GALFAN	$1.6386832
191.	GARI	$0.0375240
192.	GAT**	$0.0000000
193.	GATE**	$0.0000000
194.	GEN**	$0.0000000
195.	GENE*	$1.2467461
196.	GET	$0.7966969
197.	GLMR	$0.3835063
198.	GMT	$0.3851205
199.	GMX	$32.5640874
200.	GODS	$0.2403136
201.	GOG*	$0.0847262
202.	GOM2	$0.0045210
203.	GRNC*	$0.0794655
204.	GRT	$0.0644695
205.	GST	$0.0259475
206.	GT	$3.8283511
207.	GXT	$0.0015052
208.	GZE**	$0.0000000
209.	GZIL*	$4.8458171
210.	HBAR	$0.0471047
211.	HBB	$0.0645693
212.	HEART	$0.0044909
213.	HERO	$0.0040153
214.	HGET	$0.3483396
215.	HMT*	$0.0429807
216.	HNT	$2.8245828
217.	HOLY*	$1.1335357
218.	HOT**	$0.0000000
219.	HT	$5.6096533
220.	HUM	$0.0753202
221.	HXRO*	$0.0360251
222.	HYDRO*	$0.0000000
223.	IDH*	$0.0002662
224.	IGNX**	$0.0000000
225.	ILK**	$0.0000000
226.	IMX	$0.4485000
227.	IND**	$0.0000000
228.	INDI*	$0.1057637
229.	INDI_IEO_TICKET**	$0.0000000
230.	INTER	$2.2220025
231.	IP3*	$0.2490543

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Remaining Cryptocurrencies and Tokens (excl. FTT) (Cont.)	
232.	IPSX**	$0.0000000
233.	IXT**	$0.0000000
234.	JET*	$0.0536241
235.	JOE	$0.1576808
236.	JST	$0.0226663
237.	KBTT	$0.0007129
238.	KIN*	$0.0000080
239.	KLAY	$0.1792372
240.	KLUNC*	$0.1539537
241.	KMD	$0.1879196
242.	KNC	$0.5928001
243.	KNCL	$0.5928001
244.	KRL	$0.2927662
245.	KSHIB	$0.0097500
246.	KSM	$25.9275204
247.	KSOS	$0.0001771
248.	LALA**	$0.0000000
249.	LBL	$0.0042605
250.	LCX	$0.0482000
251.	LDC**	$0.0000000
252.	LDO	$1.1764306
253.	LEND**	$0.0000000
254.	LEO	$4.0838828
255.	LIKE	$0.0041486
256.	LINA	$0.0061216
257.	LINK	$6.7932499
258.	LND*	$0.0000000
259.	LOOKS	$0.1468043
260.	LOOM	$0.0439616
261.	LPT	$7.5747441
262.	LRC	$0.2596744
263.	LTC	$60.6106000
264.	LTX	$0.3110735
265.	LUA*	$0.0114964
266.	LUNA2	$1.6770056
267.	LUNC*	$0.0001540
268.	MAGIC*	$0.2456470
269.	MAID	$0.1184386
270.	MANA	$0.4919000
271.	MAPS*	$0.0000000
272.	MARX	$0.0089775
273.	MASK	$3.3033138
274.	MATH*	$0.0980750
275.	MATIC	$1.0265325
276.	MBS	$0.0898182
277.	MCB	$4.3032898
278.	MCO**	$0.0000000

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Remaining Cryptocurrencies and Tokens (excl. FTT) (Cont.)	
279.	MEDIA*	$2.2217798
280.	MER*	$0.0051965
281.	MGO**	$0.0000000
282.	MIMO	$0.0142254
283.	MIOTA	$0.2228489
284.	MITH	$0.0145306
285.	MITX	$0.0038093
286.	MKR	$780.1942307
287.	MNGO*	$0.0088006
288.	MNR**	$0.0000000
289.	MOB	$0.6213997
290.	MPLX*	$0.0500605
291.	MRK**	$0.0000000
292.	MSOL	$16.0000000
293.	MSRM*	$155,146.7074632
294.	MT	$0.0001984
295.	MTA	$0.0388458
296.	MTC*	$0.0648582
297.	MTL	$0.6666573
298.	MVL	$0.0034930
299.	MYC*	$0.0240728
300.	NEAR	$2.1160000
301.	NEO	$6.7363650
302.	NEXO	$0.7285254
303.	NFCWIN-SB-2021	$1.0000000
304.	NII	$0.0003073
305.	NPLC*	$0.0000037
306.	NPXS**	$0.0000000
307.	NUC*	$0.0000000
308.	NUM	$0.0403188
309.	OAX	$0.0916656
310.	OKB	$19.0903594
311.	OMG	$1.2318000
312.	ONT	$0.1763431
313.	ORBS	$0.0246122
314.	ORCA	$0.4958000
315.	OXY*	$0.0000000
316.	PAI	$0.0002740
317.	PAL**	$0.0000000
318.	PCI	$0.2461043
319.	PEOPLE	$0.0320352
320.	PERI	$0.0761159
321.	PERP	$0.4211518
322.	PLA	$0.1956041
323.	PLG*	$0.0002596
324.	PLI	$0.0530000
325.	PMA	$0.0000183

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Remaining Cryptocurrencies and Tokens (excl. FTT) (Cont.)	
326.	POLIS*	$0.1772295
327.	PORT*	$0.0238768
328.	POWR	$0.1392196
329.	PPL**	$0.0000000
330.	PPP**	$0.0000000
331.	PRISM	$0.0043781
332.	PROM	$4.3251889
333.	PSG	$5.8781611
334.	PSY	$0.0233829
335.	PTU*	$0.3702685
336.	PUNDIX	$0.3642664
337.	PWV**	$0.0000000
338.	PYTH	$0.0000000
339.	QASH*	$0.0117486
340.	QBZ**	$0.0000000
341.	QI	$0.0063072
342.	QKC	$0.0078844
343.	QTUM	$2.1935600
344.	RAMP	$0.0287482
345.	RAY	$0.2532873
346.	RBLX**	$0.0000000
347.	RBTC	$16,871.6300000
348.	REAL	$0.1050873
349.	REDI*	$0.0000000
350.	REEF	$0.0034151
351.	REN	$0.0824000
352.	RENBTC	$16,476.6225011
353.	REP	$5.1596083
354.	RFOX	$0.0062973
355.	RIF	$0.0387725
356.	RNDR	$0.5381211
357.	ROOBEE	$0.0009154
358.	ROOK*	$12.2942799
359.	RSR	$0.0042055
360.	RUNE	$1.1476770
361.	SAL**	$0.0000000
362.	SAND	$0.6218413
363.	SECO	$1.0001000
364.	SER	$0.0105808
365.	SGN**	$0.0000000
366.	SGR**	$0.0000000
367.	SHIB	$0.0000098
368.	SHORT_BIDEN_TOKEN	$0.0000000
369.	SHP**	$0.0000000
370.	SHPING	$0.0049610
371.	SHX	$0.0005588
372.	SIX**	$0.0000000

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Remaining Cryptocurrencies and Tokens (excl. FTT) (Cont.)	
373.	SKL	$0.0269854
374.	SLND*	$0.2972229
375.	SLP	$0.0025947
376.	SLRS*	$0.0033216
377.	SNIP**	$0.0000000
378.	SNX	$1.8312933
379.	SNY	$0.0975026
380.	SOL	$16.2471144
381.	SOLO	$0.2279210
382.	SOS	$0.0000002
383.	SPA	$0.0069230
384.	SPDR*	$0.0000650
385.	SPELL	$0.0006802
386.	SPHTX**	$0.0000000
387.	SRM*	$0.1551467
388.	SRX	$0.0148499
389.	SSX	$0.0149817
390.	STAC**	$0.0000000
391.	STACS**	$0.0000000
392.	STARS	$0.0325200
393.	STEP*	$0.0069923
394.	STETH	$1,252.4649000
395.	STG*	$0.3307143
396.	STMX	$0.0048053
397.	STORJ	$0.3129665
398.	STSOL	$18.6929248
399.	STU**	$0.0000000
400.	STX	$0.2255435
401.	SUN	$0.0054091
402.	SUN_OLD	$0.0054091
403.	SUPER	$0.1040800
404.	SUSHI	$1.2374952
405.	SWEAT	$0.0143510
406.	SXP	$0.2289366
407.	SYL**	$0.0000000
408.	SYN*	$0.4771438
409.	TAPT	$5.3425111
410.	TEM**	$0.0000000
411.	TFT**	$0.0000000
412.	THRT**	$0.0000000
413.	THX**	$0.0000000
414.	TLM	$0.0157681
415.	TMTG	$0.0000923
416.	TOMO	$0.2907561
417.	TON	$1.1965831
418.	TONCOIN	$1.5482817
419.	TPAY**	$0.0000000

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Remaining Cryptocurrencies and Tokens (excl. FTT) (Cont.)	
420.	TPT	$0.0062374
421.	TRL	$0.0225543
422.	TRU	$0.0345301
423.	TRUMP_TOKEN	$0.0000000
424.	TRUMPFEBWIN	$0.0000000
425.	TRUMPGO	$1.0000000
426.	TRUMPLOSE	$1.0000000
427.	TRUMPSTAY	$0.0000000
428.	TRUMPWIN	$0.0000000
429.	TRX	$0.0556107
430.	TTU**	$0.0000000
431.	TULIP*	$1.3862922
432.	UBT	$0.1414271
433.	UBTC**	$0.0000000
434.	UBXT	$0.0015159
435.	UKG**	$0.0000000
436.	UMEE	$0.0083132
437.	UNI	$5.7583446
438.	VET	$0.0211672
439.	VFOX	$0.0941208
440.	VGX	$0.2295354
441.	VI**	$0.0000000
442.	VIDY	$0.0000838
443.	VIDYX	$0.0006897
444.	VIO**	$0.0000000
445.	VOY**	$0.0000000
446.	VUU**	$0.0000000
447.	VZT**	$0.0000000
448.	WABI	$0.0624643
449.	WAVAX	$6.0000000
450.	WAVES	$2.3262914
451.	WAXL	$0.6885064
452.	WBTC	$16,864.9139190
453.	WEMIX	$1.4722348
454.	WFLOW	$15.0000000
455.	WIN	$0.0000949
456.	WLO**	$0.0000000
457.	WOM	$0.0302677
458.	WRX	$0.1547882
459.	XCF*	$0.0000000
460.	XDC	$0.0271151
461.	XEM	$0.0329337
462.	XES**	$0.0000000
463.	XKI**	$0.0000000
464.	XLM	$0.0938490
465.	XMR	$125.5384776
466.	XNK**	$0.0000000

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Remaining Cryptocurrencies and Tokens (excl. FTT) (Cont.)	
467.	XNO	$0.0083402
468.	XPLA*	$0.0518939
469.	XPR	$0.0019111
470.	XPT*	$0.0000000
471.	XRP	$0.3762385
472.	XTZ	$1.0702000
473.	YFI	$6,389.0679600
474.	YFII	$1,903.5322345
475.	YGG	$0.2386170
476.	ZCO**	$0.0000000
477.	ZEC	$38.3224320
478.	ZEN	$10.1894779
479.	ZIL	$0.0224346
480.	ZPR*	$0.0000150
481.	ZRX	$0.1830295
482.	ZWAP*	$1.2803053
	Non-Marketable Assets - LOCKED Digital Assets	
483.	ATLAS_IEF_LOCKED*	$0.0016771
484.	BOBA_LOCKED*	$0.1139502
485.	FIDA_IEF_LOCKED*	$0.0761691
486.	FIDA_LOCKED*	$0.0959739
487.	LUNA2_LOCKED*	$0.8444760
488.	MAPS_IEF_LOCKED*	$0.0000000
489.	MAPS_LOCKED*	$0.0000000
490.	MEDIA_LOCKED*	$1.7526386
491.	MSRM_LOCKED*	$104,541.3398598
492.	OXY_IEF_LOCKED*	$0.0000000
493.	OXY_LOCKED*	$0.0000000
494.	POLIS_IEF_LOCKED*	$0.1219276
495.	PYTH_IEF_LOCKED	$0.0000000
496.	PYTH_LOCKED	$0.0000000
497.	RAY_IEF_LOCKED*	$0.1777578
498.	SOL_IEF_LOCKED*	$10.5284958
499.	SRM_IEF_LOCKED*	$0.1042713
500.	SRM_LOCKED*	$0.1045413
501.	UBXT_LOCKED	$0.0015159
502.	USD_IEF_LOCKED*	$0.8319019
	Non-Marketable Assets - CUSTOM Tokens	
503.	MAPS_CUSTOM (Customer ID 266388)*	$0.0000000
504.	OXY_CUSTOM (Customer ID 266388)*	$0.0000000
	OXY_CUSTOM (Customer ID 289114)*	$0.0000000
505.	SRM_CUSTOM (Customer ID 289114)*	$0.1046495
	SRM_CUSTOM (Customer ID 368185)*	$0.1144301
	SRM_CUSTOM (Customer ID 374171)*	$0.1044750
	SRM_CUSTOM (Customer ID 408404)*	$0.0999159

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Non-Marketable Assets - CUSTOM Tokens (Cont.)	
505.	SRM_CUSTOM (Customer ID 410499)*	$0.0999159
	SRM_CUSTOM (Customer ID 2588067)*	$0.0977176
	SRM_CUSTOM (Customer ID 2791093)*	$0.1044750
	SRM_CUSTOM (Customer ID 3064436)*	$0.1144301
	Non-Marketable Assets - Options	
506.	LOCKED_MAPS_STRIKE-0.07_VEST-2030-1*	$0.0000000
	LOCKED_MAPS_STRIKE-0.07_VEST-2030-2*	$0.0000000
507.	LOCKED_OXY_STRIKE-0.03_VEST-2030-1*	$0.0000000
	LOCKED_OXY_STRIKE-0.03_VEST-2030-2*	$0.0000000
508.	LOCKED_SRM_STRIKE-0.1_VEST-2030-1*	$0.1165304
	LOCKED_SRM_STRIKE-0.1_VEST-2030-2*	$0.1220657
	FTX Equity Claims and FTT	
509.	FTT*	$0.0000000
510.	FTT_CUSTOM (Customer ID 151162)*	$0.0000000
	FTT_CUSTOM (Customer ID 160222)*	$0.0000000
	FTT_CUSTOM (Customer ID 175907)*	$0.0000000
	FTT_CUSTOM (Customer ID 205992)*	$0.0000000
	FTT_CUSTOM (Customer ID 713123)*	$0.0000000
	FTT_CUSTOM (Customer ID 1743405)*	$0.0000000
	FTT_CUSTOM (Customer ID 1785423)*	$0.0000000
511.	FTT_LOCKED*	$0.0000000
512.	FTT_R3*	$0.0000000
513.	FTT_STRIKE-0.4_EXERCISE-2030*	$0.0000000
	FTT_STRIKE-0.4_EXERCISE-2030*	$0.0000000
514.	FTT_STRIKE-0.4_UNLOCK-EXPIRE-2030*	$0.0000000
	FTT_STRIKE-0.4_UNLOCK-EXPIRE-2030*	$0.0000000
515.	FTX_EQUITY*	$0.0000000
516.	FTX_EQUITY_OPTIONS_PER_AWARD_AGREEMENTS_PENDING_MAY_2021*	$0.0000000
517.	FTX_EQUITY_STRIKE-2.28_VEST-2022_EXPIRE-2030*	$0.0000000
518.	WEST_REALM_EQUITY*	$0.0000000
519.	WEST_REALM_EQUITY_OPTIONS_PER_AWARD_AGREEMENTS_PENDING_MAY_2021*	$0.0000000
520.	WEST_REALM_EQUITY_POSTSPLIT*	$0.0000000
521.	WEST_REALM_EQUITY_STRIKE-0.33_EXPIRE-2030*	$0.0000000
	Leveraged Tokens	
522.	ADABEAR	$0.0000000
523.	ADABULL	$0.1099645
524.	ADADOOM	$0.0523066
525.	ADAHALF	$26,457.7365100
526.	ADAHEDGE	$8.3123883
527.	ADAMOON	$0.2948852

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Leveraged Tokens (Cont.)	
528.	ALGOBEAR	$0.0000000
529.	ALGOBULL	$0.0000000
530.	ALGODOOM	$0.0000000
531.	ALGOHALF	$9,934.4971530
532.	ALGOHEDGE	$49.6354567
533.	ALGOMOON	$0.0000000
534.	ALTBEAR	$0.0000037
535.	ALTBULL	$0.0987011
536.	ALTDOOM	$0.0061345
537.	ALTHALF	$14,833.9244500
538.	ALTHEDGE	$86.3468666
539.	ALTMOON	$0.0006003
540.	ASDBEAR	$0.0000000
541.	ASDBULL	$0.0000001
542.	ASDDOOM	$0.0007073
543.	ASDHALF	$6,989.2699420
544.	ASDHEDGE	$17.3960638
545.	ASDMOON	$0.0025923
546.	ATOMBEAR	$0.0000000
547.	ATOMBULL	$0.0000064
548.	ATOMDOOM	$0.0253355
549.	ATOMHALF	$19,453.0853900
550.	ATOMHEDGE	$8.4440723
551.	ATOMMOON	$0.0002407
552.	BALBEAR	$0.0000001
553.	BALBULL	$0.0000239
554.	BALHALF	$7,873.8791210
555.	BALHEDGE	$53.0641831
556.	BCHBEAR	$0.0000580
557.	BCHBULL	$0.0000022
558.	BCHDOOM	$0.0004450
559.	BCHHALF	$5,049.9221550
560.	BCHHEDGE	$404.1708021
561.	BCHMOON	$0.0000000
562.	BEAR	$0.0002263
563.	BEARSHIT	$0.0000008
564.	BNBBEAR	$0.0000000
565.	BNBBULL	$31.3316250
566.	BNBDOOM	$0.0135797
567.	BNBHALF	$47,192.4636900
568.	BNBHEDGE	$3.5969590
569.	BNBMOON	$0.0013545
570.	BSVBEAR	$0.0000019
571.	BSVBULL	$0.0000000
572.	BSVDOOM	$0.0000000
573.	BSVHALF	$3,590.5460510
574.	BSVHEDGE	$247.1835878

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Leveraged Tokens (Cont.)	
575.	BSVMOON	$0.0000000
576.	BTC3S	$0.0000000
577.	BTCSHORT	$0.0000000
578.	BULL	$46.8805090
579.	BULLSHIT	$0.0408873
580.	BVOL	$383.9608842
581.	COMPBEAR	$0.0000002
582.	COMPBULL	$0.0000014
583.	COMPHALF	$6,845.7817960
584.	COMPHEDGE	$83.8036923
585.	CUSDTBEAR	$11,590.3414900
586.	CUSDTBULL	$4,946.0920590
587.	CUSDTHALF	$5,204.3890910
588.	CUSDTHEDGE	$5,807.4255260
589.	DEFIBEAR	$0.0001389
590.	DEFIBULL	$0.0045419
591.	DEFIHALF	$8,325.7783530
592.	DEFIHEDGE	$193.5035105
593.	DMGBEAR	$0.0000187
594.	DMGBULL	$0.0000000
595.	DMGHEDGE	$245.4960819
596.	DOGEBEAR	$0.0000000
597.	DOGEBEAR2021	$0.0463891
598.	DOGEBULL	$0.0244994
599.	DOGEDOOM	$13.5655226
600.	DOGEHALF	$91,967.0139400
601.	DOGEHEDGE	$0.3192268
602.	DOGEMOON	$0.1555753
603.	DOOM	$19.9254775
604.	DOOMSHIT	$0.0385002
605.	DRGNBEAR	$0.0000021
606.	DRGNBULL	$0.0211301
607.	DRGNDOOM	$1.7276392
608.	DRGNHALF	$15,076.9989900
609.	DRGNHEDGE	$54.0990188
610.	DRGNMOON	$0.0187552
611.	EOSBEAR	$0.0000018
612.	EOSBULL	$0.0000001
613.	EOSDOOM	$0.0000001
614.	EOSHALF	$4,759.4851730
615.	EOSHEDGE	$179.8087441
616.	EOSMOON	$0.0000001
617.	ETCBEAR	$0.0000000
618.	ETCBULL	$0.0024248
619.	ETCDOOM	$0.0000000
620.	ETCHALF	$21,221.9104600
621.	ETCHEDGE	$8.2806052

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Leveraged Tokens (Cont.)	
622.	ETCMOON	$0.0000017
623.	ETH3L	$0.0000000
624.	ETH3S	$0.0000000
625.	ETHBEAR	$0.0000000
626.	ETHBULL	$2.4760575
627.	ETHDOOM	$0.0016732
628.	ETHHALF	$18,469.7957700
629.	ETHHEDGE	$18.4207875
630.	ETHMOON	$0.0000019
631.	EXCHBEAR	$0.0000972
632.	EXCHBULL	$295.1514787
633.	EXCHDOOM	$0.1860545
634.	EXCHHALF	$17,375.5146000
635.	EXCHHEDGE	$84.8886955
636.	EXCHMOON	$5.3614867
637.	GRTBEAR	$0.0000167
638.	GRTBULL	$0.0000003
639.	HALF	$10,559.2005400
640.	HALFSHIT	$17,491.1907500
641.	HEDGE	$139.4945515
642.	HEDGESHIT	$41.6002097
643.	HTBEAR	$0.0001351
644.	HTBULL	$0.0716140
645.	HTDOOM	$0.0000004
646.	HTHALF	$9,217.4647730
647.	HTHEDGE	$152.3190431
648.	HTMOON	$0.0024429
649.	IBVOL***	$0.0000000
650.	JPYBEAR	$3,783.7281240
651.	KLUNCBEAR	$2,090.2842430
652.	KNCBEAR	$0.0000002
653.	KNCBULL	$0.0000155
654.	KNCHALF	$5,886.9490350
655.	KNCHEDGE	$100.4984535
656.	LEOBEAR	$0.0541314
657.	LEOBULL	$296.0310385
658.	LEODOOM	$1,245.0328410
659.	LEOHALF	$14,692.5310700
660.	LEOHEDGE	$416.1034786
661.	LEOMOON	$10.0705551
662.	LINKBEAR	$0.0000000
663.	LINKBULL	$0.0001093
664.	LINKDOOM	$0.0000136
665.	LINKHALF	$12,059.6325400
666.	LINKHEDGE	$10.6713596
667.	LINKMOON	$0.0152255
668.	LTCBEAR	$0.0000615

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Leveraged Tokens (Cont.)	
669.	LTCBULL	$0.0000851
670.	LTCDOOM	$0.0030877
671.	LTCHALF	$8,769.4548190
672.	LTCHEDGE	$350.0723044
673.	LTCMOON	$0.0000020
674.	MATICBEAR	$0.0000000
675.	MATICBEAR2021	$0.0000022
676.	MATICBULL	$0.0003941
677.	MATICDOOM	$0.0000000
678.	MATICHALF	$83,551.6928100
679.	MATICHEDGE	$0.0633150
680.	MATICMOON	$0.0000000
681.	MIDBEAR	$0.0000945
682.	MIDBULL	$0.3459609
683.	MIDDOOM	$0.0056389
684.	MIDHALF	$11,723.2535300
685.	MIDHEDGE	$123.1185961
686.	MIDMOON	$0.0430683
687.	MKRBEAR	$0.0000003
688.	MKRBULL	$0.0671530
689.	MKRHALF	$12,145.3183000
690.	MKRHEDGE	$50.0188578
691.	MOON	$0.0526138
692.	MOONSHIT	$0.0205360
693.	OKBBEAR	$0.0000000
694.	OKBBULL	$0.8581410
695.	OKBDOOM	$0.0000000
696.	OKBHALF	$21,894.0791500
697.	OKBHEDGE	$6.1667638
698.	OKBMOON	$0.0321605
699.	PAXGBEAR	$9,701.5780080
700.	PAXGBULL	$3,484.0791990
701.	PAXGHALF	$5,207.0757900
702.	PAXGHEDGE	$5,346.6198310
703.	PRIVBEAR	$0.0000001
704.	PRIVBULL	$0.0231324
705.	PRIVHALF	$9,339.6864750
706.	PRIVHEDGE	$291.5226786
707.	SUSHIBEAR	$0.0000000
708.	SUSHIBULL	$0.0000000
709.	SUSHIHALF	$6,529.6163500
710.	SUSHIHEDGE	$20.0885420
711.	SXPBEAR	$0.0000000
712.	SXPBULL	$0.0000000
713.	SXPHALF	$5,393.0349640
714.	SXPHEDGE	$86.1083925
715.	THETABEAR	$0.0000000

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Leveraged Tokens (Cont.)	
716.	THETABULL	$0.0004096
717.	THETAHALF	$14,122.6296600
718.	THETAHEDGE	$21.0005876
719.	TOMOBEAR	$0.0000000
720.	TOMOBEAR2021	$0.0000049
721.	TOMOBULL	$0.0000000
722.	TOMODOOM	$0.0000000
723.	TOMOHALF	$8,973.4768520
724.	TOMOHEDGE	$10.5818576
725.	TOMOMOON	$0.0000000
726.	TRXBEAR	$0.0000000
727.	TRXBULL	$0.0091679
728.	TRXDOOM	$0.0000000
729.	TRXHALF	$17,261.7622800
730.	TRXHEDGE	$37.7394181
731.	TRXMOON	$0.0000001
732.	TRYBBEAR	$2,188.1014370
733.	TRYBBULL	$1,905.2635810
734.	TRYBHALF	$6,102.3209960
735.	TRYBHEDGE	$3,975.9875420
736.	UNISWAPBEAR	$0.0088776
737.	UNISWAPBULL	$0.0173830
738.	UNISWAPHALF	$4,722.3967030
739.	UNISWAPHEDGE	$801.9195961
740.	USDTBEAR	$3,058.7365350
741.	USDTBULL	$10,869.6297300
742.	USDTDOOM	$6,025.7912030
743.	USDTHALF	$6,168.4232660
744.	USDTHEDGE	$3,827.2826750
745.	USDTMOON	$5,535.0918740
746.	VETBEAR	$0.0000013
747.	VETBULL	$0.0000482
748.	VETHALF	$7,881.8207010
749.	VETHEDGE	$95.5379331
750.	XAUTBEAR	$4,535.0413900
751.	XAUTBULL	$4,282.0145160
752.	XAUTHALF	$5,635.9334290
753.	XAUTHEDGE	$4,684.9190310
754.	XLMBEAR	$0.0108123
755.	XLMBULL	$0.0010346
756.	XRPBEAR	$0.0000000
757.	XRPBULL	$0.0000129
758.	XRPDOOM	$0.0992402
759.	XRPHALF	$12,340.2866700
760.	XRPHEDGE	$43.5051964
761.	XRPMOON	$0.0000973
762.	XTZBEAR	$0.0000002

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Leveraged Tokens (Cont.)	
763.	XTZBULL	$0.0000058
764.	XTZDOOM	$0.0000070
765.	XTZHALF	$5,426.9375860
766.	XTZHEDGE	$80.0613995
767.	XTZMOON	$2.1647956
768.	ZECBEAR	$0.0022051
769.	ZECBULL	$0.0000600
	Tokenized Stocks	
770.	AAPL	$164.1105734
771.	ABNB	$96.0000000
772.	ACB	$0.9999615
773.	AMC	$2.3736839
774.	AMD	$71.5300000
775.	AMZN	$141.0000000
776.	AMZNPRE**	$0.0000000
777.	APEAMC	$2.8312387
778.	APHA	$3.3000000
779.	ARKK	$36.7500000
780.	BABA	$69.6482759
781.	BB	$4.3800000
782.	BILI	$11.5000000
783.	BITO	$141.1510000
784.	BITW	$654.0250000
785.	BNTX	$130.0069841
786.	BYND	$10.0000000
787.	CBSE**	$0.0000000
788.	CGC	$1.9770210
789.	COIN	$30.0000000
790.	CRON	$3.5830000
791.	DKNG	$10.2000000
792.	ETHE	$9.9990000
793.	FB	$118.0000000
794.	GBTC	$8.4053969
795.	GDX	$28.0000000
796.	GDXJ	$34.6500000
797.	GLD	$164.0000000
798.	GLXY	$2.8534083
799.	GME	$21.7725000
800.	GMEPRE**	$0.0000000
801.	GOOGL	$140.0000000
802.	GOOGLPRE**	$0.0000000
803.	HOOD	$8.9000000
804.	HOOD_PRE**	$0.0000000
805.	MRNA	$162.2837500
806.	MSTR	$176.0022727
807.	NFLX	$221.5600000

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Tokenized Stocks (Cont.)	
808.	NIO	$7.1215967
809.	NOK	$192.0000000
810.	NVDA	$179.2500000
811.	NVDA_PRE**	$0.0000000
812.	PENN	$35.0360000
813.	PFE	$57.0000000
814.	PYPL	$82.7457524
815.	SLV	$21.0000000
816.	SPY	$395.2800000
817.	SQ	$68.4769563
818.	TLRY	$1.0888269
819.	TSLA	$218.9500000
820.	TSLAPRE**	$0.0000000
821.	TSM	$86.2900000
822.	TWTR	$54.2000000
823.	UBER	$20.0350000
824.	USO	$139.3253569
825.	WNDR	$0.1800000
826.	ZM	$87.9242857
	Spot+ Derivatives (EU Only)	
827.	1INCH	$0.5506265
828.	AAVE	$63.9206190
829.	AGLD	$0.2463000
830.	AKRO	$0.0026846
831.	ALCX	$17.5644480
832.	ALEPH	$0.0634082
833.	ALGO	$0.2959040
834.	ALICE	$1.1828905
835.	ALPHA	$0.0912154
836.	ANC	$0.0531424
837.	APE	$3.1755724
838.	APT	$4.7424485
839.	ASD	$0.0667762
840.	ATLAS	$0.0029998
841.	ATOM	$11.5991618
842.	AUDIO	$0.1566829
843.	AURY	$0.5119689
844.	AVAX	$14.1912756
845.	AXS	$6.8561913
846.	BADGER	$2.6147338
847.	BAL	$5.2393950
848.	BAND	$2.2614453
849.	BAO	$0.0001056
850.	BAR	$3.9021409
851.	BAT	$0.2526885
852.	BCH	$102.2131116

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Spot+ Derivatives (EU Only) (Cont.)	
853.	BF_POINT**	$0.0000000
854.	BICO	$0.2864203
855.	BIT	$0.3165593
856.	BLT	$0.0418393
857.	BNB	$286.5200580
858.	BNT	$0.3792324
859.	BOBA	$0.2207532
860.	BTC	$16,871.6300000
861.	BTT	$0.0000007
862.	C98	$0.2040890
863.	CEL	$0.6219474
864.	CHR	$0.1122728
865.	CHZ	$0.2197552
866.	CITY	$4.6107138
867.	CLV	$0.0598594
868.	COMP	$37.9232400
869.	CONV	$0.0005770
870.	COPE	$0.0063050
871.	CQT	$0.0874388
872.	CREAM	$6.8911210
873.	CRO	$0.0875500
874.	CRV	$0.6516809
875.	CTX	$2.2718017
876.	CUSDT	$0.0218002
877.	CVC	$0.0911835
878.	CVX	$4.0218594
879.	DAWN	$0.7468876
880.	DENT	$0.0006846
881.	DFL	$0.0011693
882.	DMG	$0.0091086
883.	DODO	$0.1128715
884.	DOGE	$0.0828523
885.	DOT	$5.6705792
886.	DYDX	$1.9869782
887.	EDEN	$0.0804372
888.	EMB	$0.0192000
889.	ENJ	$0.3445027
890.	ENS	$12.2252550
891.	ETH	$1,258.8400000
892.	ETHW	$4.1505988
893.	EUL	$6.1800531
894.	FIDA	$0.2303338
895.	FRONT	$0.1701556
896.	FTM	$0.1917738
897.	FXS	$5.1236807
898.	GAL	$1.5049689
899.	GALA	$0.0308076

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Spot+ Derivatives (EU Only) (Cont.)	
900.	GALFAN	$1.6386832
901.	GARI	$0.0375240
902.	GENE	$1.7487763
903.	GMT	$0.3851205
904.	GMX	$32.5640874
905.	GODS	$0.2403136
906.	GOG	$0.1030913
907.	GRT	$0.0644695
908.	GST	$0.0259475
909.	GT	$3.8283511
910.	HBB	$0.0645693
911.	HGET	$0.3483396
912.	HMT	$0.0503377
913.	HNT	$2.8245828
914.	HOLY	$1.2800000
915.	HT	$5.6096533
916.	HUM	$0.0753202
917.	HXRO	$0.0527828
918.	IMX	$0.4485000
919.	INDI	$0.1317318
920.	INTER	$2.2220025
921.	IP3	$0.2929130
922.	JET	$0.0754000
923.	JOE	$0.1576808
924.	JST	$0.0226663
925.	KBTT	$0.0007129
926.	KIN	$0.0000092
927.	KLUNC	$0.1877101
928.	KNC	$0.5928001
929.	KSHIB	$0.0097500
930.	KSOS	$0.0001771
931.	LDO	$1.1764306
932.	LEO	$4.0838828
933.	LINA	$0.0061216
934.	LINK	$6.7932499
935.	LOOKS	$0.1468043
936.	LRC	$0.2596744
937.	LTC	$60.6106000
938.	LUA	$0.0127744
939.	LUNA2	$1.6770056
940.	LUNC	$0.0001877
941.	MAGIC	$0.2734465
942.	MANA	$0.4919000
943.	MAPS	$0.0985383
944.	MASK	$3.3033138
945.	MATH	$0.1112000
946.	MATIC	$1.0265325

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Spot+ Derivatives (EU Only) (Cont.)	
947.	MBS	$0.0898182
948.	MCB	$4.3032898
949.	MEDIA	$4.7500000
950.	MER	$0.0078455
951.	MKR	$780.1942307
952.	MNGO	$0.0123275
953.	MOB	$0.6213997
954.	MPLX	$0.0635720
955.	MTA	$0.0388458
956.	MTL	$0.6666573
957.	MYC	$0.0304800
958.	NEAR	$2.1160000
959.	NEXO	$0.7285254
960.	OKB	$19.0903594
961.	OMG	$1.2318000
962.	ORBS	$0.0246122
963.	ORCA	$0.4958000
964.	OXY	$0.0314364
965.	PEOPLE	$0.0320352
966.	PERP	$0.4211518
967.	POLIS	$0.2158631
968.	PORT	$0.0289414
969.	PRISM	$0.0043781
970.	PROM	$4.3251889
971.	PSG	$5.8781611
972.	PSY	$0.0233829
973.	PTU	$0.8981820
974.	PUNDIX	$0.3642664
975.	QI	$0.0063072
976.	RAMP	$0.0287482
977.	RAY	$0.2532873
978.	REAL	$0.1050873
979.	REEF	$0.0034151
980.	REN	$0.0824000
981.	RNDR	$0.5381211
982.	ROOK	$14.2065247
983.	RSR	$0.0042055
984.	RUNE	$1.1476770
985.	SAND	$0.6218413
986.	SECO	$1.0001000
987.	SHIB	$0.0000098
988.	SKL	$0.0269854
989.	SLND	$0.3878150
990.	SLP	$0.0025947
991.	SLRS	$0.0039720
992.	SNX	$1.8312933
993.	SNY	$0.0975026

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Spot+ Derivatives (EU Only) (Cont.)	
994.	SOL	$16.2471144
995.	SOS	$0.0000002
996.	SPA	$0.0069230
997.	SPELL	$0.0006802
998.	SRM	$0.3722465
999.	STARS	$0.0325200
1000.	STEP	$0.0080138
1001.	STG	$0.3901143
1002.	STMX	$0.0048053
1003.	STORJ	$0.3129665
1004.	SUN	$0.0054091
1005.	SUSHI	$1.2374952
1006.	SWEAT	$0.0143510
1007.	SXP	$0.2289366
1008.	SYN	$0.5850000
1009.	TLM	$0.0157681
1010.	TOMO	$0.2907561
1011.	TONCOIN	$1.5482817
1012.	TRU	$0.0345301
1013.	TRX	$0.0556107
1014.	TULIP	$1.6566468
1015.	UBXT	$0.0015159
1016.	UMEE	$0.0083132
1017.	UNI	$5.7583446
1018.	VGX	$0.2295354
1019.	WAVES	$2.3262914
1020.	WRX	$0.1547882
1021.	XPLA	$0.2911263
1022.	XRP	$0.3762385
1023.	YFI	$6,389.0679600
1024.	YFII	$1,903.5322345
1025.	YGG	$0.2386170
1026.	ZRX	$0.1830295
	Futures	
1027.	1INCH-1230	$0.4721000
1028.	1INCH-PERP	$0.5214000
1029.	AAPL-1230	$37.0000000
1030.	AAVE-1230	$67.0300000
1031.	AAVE-PERP	$63.4500000
1032.	ABNB-1230	$121.2100000
1033.	ACB-1230	$0.3300000
1034.	ADA-1230	$0.3762000
1035.	ADA-PERP	$0.3517000
1036.	AGLD-PERP	$0.2330500
1037.	ALCX-PERP	$16.0075000
1038.	ALGO-1230	$0.3081500

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Futures (Cont.)	
1039.	ALGO-PERP	$0.3022000
1040.	ALICE-PERP	$1.0097500
1041.	ALPHA-PERP	$0.0895000
1042.	ALT-1230	$1,817.8000000
1043.	ALT-PERP	$1,817.0000000
1044.	AMC-1230	$6.6562500
1045.	AMD-1230	$59.2200000
1046.	AMPL-PERP	$0.9584000
1047.	AMZN-1230	$85.0000000
1048.	ANC-PERP	$0.1469765
1049.	APE-1230	$2.6280000
1050.	APE-PERP	$3.1415000
1051.	APT-PERP	$4.5700000
1052.	AR-PERP	$9.5000000
1053.	ARKK-1230	$73.0000000
1054.	ASD-PERP	$0.0430000
1055.	ATLAS-PERP	$0.0017165
1056.	ATOM-1230	$18.5000000
1057.	ATOM-PERP	$11.6225000
1058.	AUDIO-PERP	$0.1506500
1059.	AVAX-1230	$12.8000000
1060.	AVAX-PERP	$12.7420000
1061.	AXS-1230	$6.8659095
1062.	AXS-PERP	$6.8920000
1063.	BABA-1230	$67.3111523
1064.	BADGER-PERP	$2.7460000
1065.	BAL-1230	$5.5250000
1066.	BAL-PERP	$5.0950000
1067.	BAND-PERP	$2.0286000
1068.	BAT-PERP	$0.2461000
1069.	BB-1230	$4.6950000
1070.	BCH-1230	$103.5600000
1071.	BCH-PERP	$104.5767209
1072.	BILI-1230	$12.0000000
1073.	BIT-PERP	$0.3137500
1074.	BITO-1230	$10.8300000
1075.	BITW-1230	$94.0000000
1076.	BNB-1230	$344.0000000
1077.	BNB-PERP	$375.6250000
1078.	BNT-PERP	$0.3659500
1079.	BNTX-1230	$166.2300000
1080.	BOBA-PERP	$0.4177500
1081.	BRZ-PERP	$0.2079946
1082.	BSV-1230	$40.3700000
1083.	BSV-PERP	$38.4000000
1084.	BTC-0331	$16,884.4589309
1085.	BTC-1230	$17,458.0000000

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Futures (Cont.)	
1086.	BTC-MOVE-1111	$2,564.6585366
1087.	BTC-MOVE-1112	$360.0000000
1088.	BTC-MOVE-2022Q4	$41.3674707
1089.	BTC-MOVE-2023Q1	$3,286.2719265
1090.	BTC-MOVE-2023Q2	$50.0000000
1091.	BTC-MOVE-WK-1111	$3,534.5555556
1092.	BTC-MOVE-WK-1118	$1,228.0000000
1093.	BTC-MOVE-WK-1125	$1,048.0000000
1094.	BTC-MOVE-WK-1202	$1,097.0000000
1095.	BTC-PERP	$17,108.0000000
1096.	BTT-PERP	$0.0000058
1097.	BYND-1230	$11.6695000
1098.	C98-PERP	$0.1821000
1099.	CAKE-PERP	$4.0775000
1100.	CEL-1230	$0.6700000
1101.	CEL-PERP	$0.9242340
1102.	CELO-PERP	$0.4975000
1103.	CGC-1230	$3.2250000
1104.	CHR-PERP	$0.0894182
1105.	CHZ-1230	$0.1854125
1106.	CHZ-PERP	$0.1872500
1107.	CLV-PERP	$0.0481600
1108.	COMP-1230	$41.4300000
1109.	COMP-PERP	$34.2200000
1110.	CREAM-PERP	$7.4280000
1111.	CRO-PERP	$0.0826500
1112.	CRON-1230	$3.0000000
1113.	CRV-PERP	$0.6524500
1114.	CVC-PERP	$0.0892500
1115.	CVX-PERP	$2.9350000
1116.	DASH-PERP	$36.6000000
1117.	DAWN-PERP	$0.9140000
1118.	DEFI-1230	$2,300.0000000
1119.	DEFI-PERP	$2,090.8000000
1120.	DENT-PERP	$0.0006846
1121.	DKNG-1230	$12.6050000
1122.	DODO-PERP	$0.1130100
1123.	DOGE-1230	$0.1025200
1124.	DOGE-PERP	$0.0743492
1125.	DOT-1230	$5.2100000
1126.	DOT-PERP	$4.9280000
1127.	DRGN-PERP	$1,446.7561515
1128.	DYDX-PERP	$1.9200000
1129.	EDEN-PERP	$0.0809900
1130.	EGLD-PERP	$45.2850000
1131.	ENJ-PERP	$0.3703783
1132.	ENS-PERP	$11.1450000

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Futures (Cont.)	
1133.	EOS-1230	$0.8737500
1134.	EOS-PERP	$0.8677500
1135.	ETC-PERP	$21.1215000
1136.	ETH-0331	$1,195.7000000
1137.	ETH-1230	$1,220.0000000
1138.	ETH-PERP	$1,223.2500000
1139.	ETHE-1230	$8.7000000
1140.	ETHW-PERP	$2.6000000
1141.	EXCH-1230	$5,681.0000000
1142.	EXCH-PERP	$5,540.1000000
1143.	FB-1230	$108.0100000
1144.	FIDA-PERP	$0.1148000
1145.	FIL-1230	$4.5200000
1146.	FIL-PERP	$4.8874211
1147.	FLM-PERP	$0.0809400
1148.	FLOW-PERP	$1.2974309
1149.	FLUX-PERP	$0.4600000
1150.	FTM-1230	$0.2303000
1151.	FTM-PERP	$0.1893000
1152.	FTT-PERP	$1.9770000
1153.	FTXDXY-PERP	$111.9907155
1154.	FXS-PERP	$4.5600000
1155.	GAL-PERP	$1.1145000
1156.	GALA-PERP	$0.0286000
1157.	GBTC-1230	$9.7125000
1158.	GDX-1230	$24.2000000
1159.	GDXJ-1230	$32.0000000
1160.	GLD-1230	$151.7000000
1161.	GLMR-PERP	$0.4610000
1162.	GME-1230	$27.7250000
1163.	GMT-1230	$0.3945000
1164.	GMT-PERP	$0.3697056
1165.	GOOGL-1230	$98.0000000
1166.	GRT-1230	$0.0944750
1167.	GRT-PERP	$0.0725000
1168.	GST-PERP	$0.0269975
1169.	HBAR-PERP	$0.0459800
1170.	HNT-PERP	$2.4105000
1171.	HOLY-PERP	$2.4165000
1172.	HOT-PERP	$0.0015500
1173.	HT-PERP	$5.7500000
1174.	ICP-PERP	$3.9800000
1175.	ICX-PERP	$0.1583000
1176.	IMX-PERP	$0.4420000
1177.	INJ-PERP	$1.5709167
1178.	IOST-PERP	$0.0091450
1179.	IOTA-PERP	$0.1696080

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Futures (Cont.)	
1180.	JASMY-PERP	$0.0038775
1181.	JPY-PERP	$0.0069600
1182.	KAVA-PERP	$0.8750000
1183.	KBTT-PERP	$0.0140000
1184.	KLAY-PERP	$0.1678500
1185.	KLUNC-PERP	$0.1860000
1186.	KNC-PERP	$0.6345000
1187.	KSHIB-PERP	$0.0114050
1188.	KSM-PERP	$26.0883248
1189.	KSOS-PERP	$0.0001660
1190.	LDO-PERP	$1.1098000
1191.	LEO-PERP	$4.1285000
1192.	LINA-PERP	$0.0071400
1193.	LINK-1230	$6.8655000
1194.	LINK-PERP	$6.7530000
1195.	LOOKS-PERP	$0.1436750
1196.	LRC-PERP	$0.2236500
1197.	LTC-1230	$61.5100000
1198.	LTC-PERP	$59.5400000
1199.	LUNA2-PERP	$1.6755000
1200.	LUNC-PERP	$0.0001702
1201.	MANA-PERP	$0.5230000
1202.	MAPS-PERP	$0.0694100
1203.	MASK-PERP	$3.2877500
1204.	MATIC-1230	$1.1749825
1205.	MATIC-PERP	$1.0346000
1206.	MEDIA-PERP	$5.1037013
1207.	MID-1230	$1,042.9000000
1208.	MID-PERP	$1,200.0000000
1209.	MINA-PERP	$0.7592500
1210.	MKR-PERP	$823.0000000
1211.	MNGO-PERP	$0.0082000
1212.	MOB-PERP	$0.9455833
1213.	MRNA-1230	$176.0000000
1214.	MSTR-1230	$187.2000000
1215.	MTL-PERP	$0.6335000
1216.	MVDA10-PERP	$8,562.5000000
1217.	MVDA25-PERP	$8,287.5000000
1218.	NEAR-1230	$0.9660000
1219.	NEAR-PERP	$1.8780000
1220.	NEO-PERP	$6.6203213
1221.	NFLX-1230	$274.6000000
1222.	NIO-1230	$12.0000000
1223.	NOK-1230	$5.8000000
1224.	NVDA-1230	$93.9750000
1225.	OKB-1230	$19.9995000
1226.	OKB-PERP	$18.5484838

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Futures (Cont.)	
1227.	OMG-1230	$1.2700000
1228.	OMG-PERP	$1.3035000
1229.	ONE-PERP	$0.0142250
1230.	ONT-PERP	$0.1626500
1231.	OP-1230	$0.9125000
1232.	OP-PERP	$0.9177500
1233.	OXY-PERP	$0.0211700
1234.	PAXG-PERP	$1,726.0666667
1235.	PENN-1230	$36.9900000
1236.	PEOPLE-PERP	$0.0499700
1237.	PERP-PERP	$0.2200500
1238.	PFE-1230	$49.0000000
1239.	POLIS-PERP	$0.1424750
1240.	PRIV-1230	$700.0000000
1241.	PRIV-PERP	$831.5000000
1242.	PROM-PERP	$4.3100000
1243.	PUNDIX-PERP	$0.8853000
1244.	PYPL-1230	$72.5000000
1245.	QTUM-PERP	$1.9200000
1246.	RAY-PERP	$0.1959000
1247.	REEF-PERP	$0.0031715
1248.	REN-PERP	$0.0824500
1249.	RNDR-PERP	$0.6500000
1250.	RON-PERP	$0.2085000
1251.	ROSE-PERP	$0.0600050
1252.	RSR-PERP	$0.0042150
1253.	RUNE-PERP	$1.0705000
1254.	RVN-PERP	$0.0213200
1255.	SAND-PERP	$0.6179500
1256.	SC-PERP	$0.0025325
1257.	SCRT-PERP	$0.8121500
1258.	SECO-PERP	$1.7828000
1259.	SHIB-PERP	$0.0000092
1260.	SHIT-1230	$2,548.1000000
1261.	SHIT-PERP	$2,194.9000000
1262.	SKL-PERP	$0.0253950
1263.	SLP-PERP	$0.0025660
1264.	SLV-1230	$21.3375000
1265.	SNX-PERP	$1.8455000
1266.	SOL-1230	$24.4175000
1267.	SOL-PERP	$16.2973217
1268.	SOS-PERP	$0.0000002
1269.	SPELL-PERP	$0.0006746
1270.	SPY-1230	$376.1000000
1271.	SQ-1230	$63.0000000
1272.	SRM-PERP	$0.4062000
1273.	STEP-PERP	$0.0103000
1274.	STG-PERP	$0.4007500

Exhibit 6
Asset Prices

	Asset	Price
	[A]	[B]
	Futures (Cont.)	
1275.	STMX-PERP	$0.0047150
1276.	STORJ-PERP	$0.3078111
1277.	STX-PERP	$0.2099804
1278.	SUSHI-1230	$0.9257000
1279.	SUSHI-PERP	$1.2376000
1280.	SXP-1230	$0.2270000
1281.	SXP-PERP	$0.2035000
1282.	THETA-PERP	$1.0464000
1283.	TLM-PERP	$0.0159950
1284.	TLRY-1230	$2.9320000
1285.	TOMO-PERP	$0.3590000
1286.	TONCOIN-PERP	$0.8165000
1287.	TRU-PERP	$0.0272500
1288.	TRUMP2024	$0.2300000
1289.	TRX-1230	$0.0724900
1290.	TRX-PERP	$0.0588975
1291.	TRYB-PERP	$0.0506800
1292.	TSLA-1230	$185.0000000
1293.	TSM-1230	$59.3975000
1294.	UBER-1230	$13.8450000
1295.	UNI-1230	$6.6250000
1296.	UNI-PERP	$5.5660000
1297.	UNISWAP-1230	$12,227.0000000
1298.	UNISWAP-PERP	$12,004.0000000
1299.	USDT-1230	$0.9969000
1300.	USDT-PERP	$0.9999000
1301.	USO-1230	$170.0000000
1302.	USTC-PERP	$0.0233200
1303.	VET-PERP	$0.0198700
1304.	WAVES-1230	$2.4800000
1305.	WAVES-PERP	$2.1065000
1306.	WSB-1230	$15,700.0000000
1307.	XAUT-PERP	$1,785.9000000
1308.	XEM-PERP	$0.0400800
1309.	XLM-PERP	$0.0872500
1310.	XMR-PERP	$129.4100000
1311.	XRP-1230	$0.3952750
1312.	XRP-PERP	$0.3680500
1313.	XTZ-1230	$1.0538000
1314.	XTZ-PERP	$0.9904000
1315.	YFI-1230	$6,125.0000000
1316.	YFI-PERP	$6,345.0000000
1317.	YFII-PERP	$1,834.7500000
1318.	ZEC-PERP	$38.3500000
1319.	ZIL-PERP	$0.0216700
1320.	ZM-1230	$90.0000000
1321.	ZRX-PERP	$0.1827500

Exhibit 6
Asset Prices

Asset	Price
[A]	**[B]**

Notes and Sources:
[1] * indicates that asset is impacted by at least one of three adjustments: Asset Liquidation Discount, DLOM, or FTX Equity and FTT Discounts.
[2] ** indicates that the asset's price is adjusted to zero, because it is stale.
[3] *** indicates that the unadjusted price of IBVOL is negative and is therefore set to zero.
[4] *See* Exhibits 1-5 and Appendix C.